

GOVERNMENT OF INDIA
ARCHÆOLOGICAL SURVEY OF INDIA

CENTRAL
ARCHÆOLOGICAL
LIBRARY

ACCESSION NO. 18447

CALL No. 913.42/Gib

D.G.A. 79

INSTRUCTIONS IN
ARCHAEOLOGY

9A

dir

School of Archaeology.
INSTRUCTIONS IN
ARCHAEOLOGY



BY

A. V. B. GIBSON

18447

913.42
Gib



LONDON
MUSEUM PRESS LIMITED

First published in Great Britain by Museum Press Limited
26 Old Brompton Road, London, S.W.7
1963

© A. V. B. Gibson 1963

18497
26. 9. 63.
913. 42 / *in*

PRINTED IN GREAT BRITAIN BY
BRISTOL TYPESETTING CO. LTD.
BARTON MANOR - ST. PHILIPS
BRISTOL 2

Recd. from W/S Lidd'sham Bone Store, Newell's on 10/11/15 for 15 sh/-

CONTENTS

CHAPTER	PAGE
ACKNOWLEDGEMENTS	8
I. WHAT IS ARCHAEOLOGY?	9
II. FIELD ARCHAEOLOGY	14
III. GOING ON A DIG	25
IV. THE OLD STONE AGE	33
V. THE MESOLITHIC PERIOD	46
VI. THE NEOLITHIC AND BRONZE AGE	56
VII. THE IRON AGE	77
VIII. ROMAN BRITAIN	91
IX. AFTER THE ROMANS	105
X. SCIENCE AND ARCHAEOLOGY	115
XI. HINTS FOR FURTHER STUDY	122
APPENDIX: FLINTS	124
INDEX	127

ILLUSTRATIONS

FIG.		PAGE
1.	Typological similarities	11
2.	The Rocks	16
3.	How Lynchets are Formed	19
4.	How to See Celtic Fields	20
5.	Crop-marks in a Field	20
6.	Useful Digging-Tools (not to scale)	26
7.	The Technique of Excavation	28
8.	Stratigraphy	31
9.	The Last Ice Age (simplified)	34
10.	Palaeolithic Tools	37
11.	River Terraces	38
12.	Ffynnon Beuno Cave, Flintshire	43
13.	The Post-Glacial Period	47
14.	Harpoons	48
15.	Mesolithic Tools and Weapons	48
16.	Mesolithic Sites and Geology	52
17.	Mesolithic Hut—Abinger Common, Surrey	52
18.	A Windmill Hill Pot	58
19.	Mother Goddess from Grimes Graves	61
20.	A Neolithic Long Barrow, Notgrove, Gloucestershire	62
21.	A Neolithic House, Skara Brae	63
22.	A Beaker and a Beaker Burial	64
23.	The Druid's Circle, Keswick	65
24.	Possible Form of Bush Barrow Burial	67
25.	Stonehenge	69

ILLUSTRATIONS

7

26.	An Urn Burial, Bleasdale, Lancashire	72
27.	Part of a Bronze Age Hoard, Co. Offaly	74
28.	The Iron Age Farm at Little Woodbury, near Salisbury	79
29.	Finds from All Cannings Cross	80
30.	Early Hill Fort Construction	81
31.	Uffington Castle, Partial Reconstruction	82
32.	Scabbard Mount, River Witham	83
33.	Iron Age Chariot, Anglesey	84
34.	A Courtyard House, Chysauster, Cornwall, and (right) a Scottish Broch based on Mousa, Orkney	86
35.	A Hill Figure and a Decoration on a bucket from a Belgic Grave	88
36.	The Belgic Settlement and Earthworks at Colchester	90
37.	Map of Roman Britain	93
38.	A Roman Fortress, based on Caerleon	95
39.	The Roman Road, Jeffry Hill, Lancashire	96
40.	A Large Roman Villa, based on Chedworth, Glou- cestershire	99
41.	Native Farmstead on Moorland	101
42.	The Sutton Hoo Ship Burial	106
43.	A Deserted Village: Cestersover, Warwickshire, simpli- fied	110
44.	Longhouses	112
45.	Halls	113
46.	Dating by Means of Radioactive Carbon ²⁴	119
47.	The Technique of Flint Flaking	125

HALF-TONE ILLUSTRATIONS

(Between pages 64 and 65)

PLATE

1. (a) An excavation in progress
(b) An archaeological section
2. A Palaeolithic rock shelter used to this day
3. Megalithic tombs
4. Prehistoric pottery
5. (a) Neolithic flint mine
(b) An Iron Age fort
6. (a) Hadrian's Wall
(b) Roman Town wall
7. A late Saxon Church Tower
8. House with original cruck construction

ACKNOWLEDGEMENTS

I SHOULD like to thank those of my friends who have kindly lent me their photographs for inclusion in this book, namely E. Clack, for plates 1 (a), 5 (b), 6 (b), and J. Dunbar for plate 6 (a).

Also I am indebted to the British Museum and the Brighton Art Gallery for permission to reproduce their photographs which comprise Plate 4.

My special thanks go to J. Wymer of the Reading Museum for permission to include a photograph of his excavations at Thatcham, Berkshire, and to Guy R. Williams whose constant help and advice made this book possible.

CHAPTER I

WHAT IS ARCHAEOLOGY?

WHAT is archaeology? An art, a science, or just a hobby? Those are some of the questions that you may be tempted to ask when you first pick up this book. Your curiosity may have been aroused by a visit to the galleries full of treasures at the British Museum, by a newspaper or magazine article, or by a trip to a site where an exciting "dig" is actually in progress.

It is not very likely that you are already an expert or you would be too busy reading specialist treatises to have any time to spare for a general introduction of this sort. But, even if you are an absolute beginner you can hardly fail to be aware of the enormous interest that is now taken in every aspect of the life of our remotest ancestors, and of the steps that can be taken to reconstruct their habits and surroundings by the traces they left behind them.

It is a pursuit as exciting as reading any detective novel or watching any mystery play and it can be more satisfying than either of these because we can take part in it ourselves. We need all the skills and the logical tenacity of a Holmes or a Maigret when we set out to solve an archaeological problem. It is one of the most fascinating forms of research in all the world.

Let us begin, then, by defining archaeology. The first dictionary we open says "Archaeology, the scientific study of the remains and monuments of the prehistoric period." This would be a good way of summing up the subject of this book as any we are likely to think of except that archaeology is not necessarily confined to the prehistoric period.

Archaeologists study men of the past, not only by reading their writings, but by excavating their homes, fortifications, sacred monuments and even their graves. Although we cannot hope to know the thoughts of our remote ancestors by this research, we can get a very good picture of how they lived and we can realise, to some extent, how they managed to deal with the problems of their day.

However carefully we excavate any one site we cannot hope to

be able to discover from it very much about our ancestors. Most sites are rather limited in what they can reveal, but we can deduce a lot by comparing our results with those from sites which are similar in date and characteristics.

For ease of reference we divide the various sites that have been excavated into broad divisions or "cultures." Culture in this sense means the whole assemblage of material obtained from any particular group of people. We can only guess roughly about their "culture" in the usually accepted sense of the term.

What are the factors that archaeologists have to bear in mind when they try to define a culture? Basically, people of the past can be divided from each other according to the materials they used for their most advanced tools. Knives, weapons and cutting tools usually give us the key to this.

As men struggled to improve these they learned to master first stone, then copper and bronze, and ultimately iron, and from these materials we derive the names "Stone Age," "Bronze Age," and "Iron Age." It would be a mistake to imagine that Bronze Age man gave up using stone tools overnight, as it were. Each group continued to use the familiar methods of their ancestors, adding the latest techniques and materials to those already available.

Within these broad divisions we can distinguish between the individual cultures by referring to the individual techniques used, pottery and tool types, styles of decoration and architecture.

In making these distinctions the archaeologist relies on man's essential conservatism. To the layman it often seems far fetched to assign a site to a particular culture on what may seem the rather slim evidence of such a detail as squiggles on pottery. Anyone who feels that archaeologists are being pedantic when they are so precise, should ask himself whether it would be correct to embroider daisies on a cricket shirt! Even in modern society we are hidebound by precedents.

We find buttons on the back of a man's tail-coat, though these serve no practical purpose whatsoever. They survive and connect us culturally with an earlier age when coat-tails had to be buttoned up when the man wearing the coat was riding a horse. How much more important must the small details of dress and habit have been to primitive folk with their superstitions and taboos.

The little pieces of pottery, glass and metal may look insignificant when lying dirty in a tray at the side of the trench. These, though, form the basis of the evidence for the study of the culture concerned and its affinities.

Fortunately man's desire to imitate others and to improve his lot makes an archaeologist's job a bit easier. Superimposed on the

traditional designs of any society there will be a pattern of changing fashions which are due to the influence of other groups. Spontaneous new ideas are very rare and trends that are apparently new can usually be traced to contact with other people from other areas. Only by knowing the great sequence of changing styles and decoration used for ordinary objects can the archaeologist understand his own site. This is the study of "typology." The acquisition of this knowledge occupies a large part of the training of an archaeologist.

Nowadays, because of the extensive work already done, we are usually able to give at least a relative date to a site once its cultural affinities have been established. The scientific techniques now available make it possible to give an absolute date to cultures within the sequence.

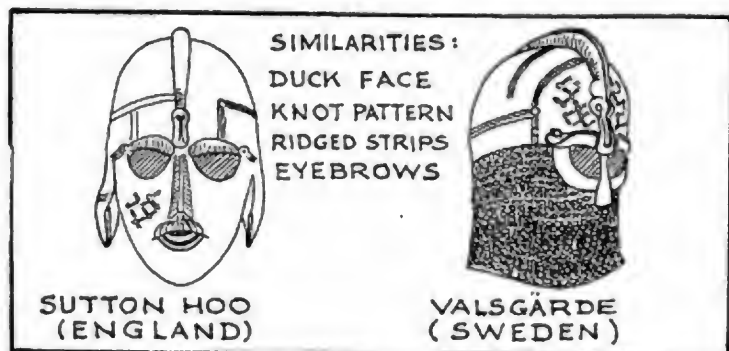


FIG. 1. Typological similarities

A good illustration of the use of typology is the helmet from the ship burial at Sutton Hoo in Suffolk (Fig. 1). Here the regalia and treasure of a king were buried in a boat under a large barrow. Much precious treasure was found, which although beautifully made is not the most important aspect archaeologically speaking. Just as exciting as the beauty of the finds is the form of decoration on them which reveals that many have come from far afield. The helmet, when reconstructed, showed itself to be closely similar in its details to the helmets from boat burials in the Uppland area of Sweden, although at first glance its shape is different.

The Swedish burials have been assigned to the sixth century, which indicates that the Sutton Hoo finds probably have a similar (or slightly later) date. Other relics from Sutton Hoo confirmed this date.

How, you may be asking yourself, can *you* accumulate the knowledge necessary to study typology?

There are several steps you can take to acquire information. Firstly, you can visit the museums. Most museums are no longer dusty repositories with over-stocked shelves and showcases. Instead they are bright show places where the various objects on display are shown to their best advantage accompanied by proper diagrams and explanatory notes.

Though less material is actually on view in these reformed galleries, the museum staff will invariably be pleased to show their reserve collections to people who are interested. If you are wondering about anything in particular your local museum curator will be only too willing to help you, either by supplying the information you need or by putting you on to the right books.

These days very many books are available often beautifully illustrated. These range from modest volumes at a very reasonable price to lavishly produced ones which are rather expensive though beautiful to own. Any of these can be borrowed from your public library even if they are not actually on the shelves. Any book you wish to read can be obtained on request from your librarian, as he is able to borrow from other libraries which have the book you need.

A third way of acquiring knowledge is, of course, by attending and helping with a "dig" conducted by a real expert. To most of us, it would seem that "digging" is the first aim and object of every keen archaeologist, but, you will notice, it has not been given such high priority on this list. This is because no-one should do any digging at all unless he or she knows exactly what the aims of the excavation are and unless the background of knowledge is already there.

While digging is an essential part of the study of the past, it is in many ways the part that has to be approached with the most trepidation, since conclusions reached from the evidence cannot be checked once the excavation is over. In this fact lies the most important aspect of digging practice. Once dug, a site cannot be dug again, so maximum accurate information must be obtained.

There is no point in excavating a site and so destroying it unless it is likely that the results will provide some new information. This does not apply, of course, to "rescue digs" where a site is threatened with destruction by building work or civil engineering. The fact that a site exists does not mean that it is in urgent need of excavation. It has lain there a long time and can very well wait a little longer until such a time as its excavation will answer a specific question.

Archaeology is much more than a Sunday afternoon recreation. It is no longer a pastime reserved for elderly, wealthy and slightly incompetent amateurs as it used to be. Many of these gentlemen ruined incomparably valuable sites in a hasty scramble for hidden antiquities. Archaeology now is a disciplined science with techniques of its own. It has a fascination second to none, but it requires a serious approach and absolute integrity.

BOOKS TO READ

- Approach to Archaeology* (Piggott), Black.
Piecing together the Past (Childe), Routledge and Kegan Paul.
Archaeology and its Problems (De Laet), Phoenix House.
Archaeology and Society (Clark), Methuen.
Digging up the Past (Woolley), Penguin.
Prehistoric Europe, the Economic Basis (Clark), Methuen.
Personality of Britain (Fox), National Museum of Wales.

CHAPTER II

FIELD ARCHAEOLOGY

BEFORE you go on to look at the sort of thing archaeologists spend their time investigating, you should acquire a basic understanding of the natural forces at work on the landscape. If you have a knowledge of elementary geology, you will stand more chance of finding archaeological sites, you will find it easier to allot those you do find to their correct period in time, and you will be less likely to confuse natural fossils and curious formations with man-made objects.

You need not go into extensive detail but just know the character of the major geological deposits with perhaps a little specialisation in your own area. A good start would be to buy the Ordnance Survey ten miles to the inch geological map of Britain. This map shows solid geology—that is the rocks that have been laid down by any means other than glaciers and rivers. The term rocks by the way is used by geologists for any naturally laid deposit, granite, sandstone, clay, chalk, etc.

It is interesting to see how the countryside was formed, before we look into the interaction of man and nature.

EROSION

The form of the landscape, with its hills, valleys and plains is due to the process of erosion that is constantly taking place. The heat of the sun, the force of the wind, and the action of water all help to break down the rocks and soil, and move them to lower levels.

Although this erosion of the landscape is very slow nevertheless in the hundreds of millions of years that it has been going on it has flattened great mountains and removed vast continents. You may ask, "Why is there any land above the sea today if it has been eroded in this manner?" The probable answer is that as the continents become lighter, because of this removal of millions of tons of rock, the sea beds get heavier, as the rivers carry their load of pebbles and silt out to sea. Eventually the sea beds become so

heavy, and the adjacent land so light, that they swing like the two arms of a pair of scales. The sea bed drops and the land rises, starting this cycle of erosion and land movement once again. Of course this geological process is very slow and we need have no fear that we are going to be suddenly jerked many hundreds of feet into the air.

The most spectacular type of erosion is that due to the work of ice, i.e. by glaciation. In Europe today one can only see glaciers in the mountains of Scandinavia and the Alps. Not so very long ago, by geological reckoning, the greater part of Northern Europe was covered by ice. The deeply scarred valleys where glaciers have passed and the great dumps of sand and gravel dropped at the edge of the ice sheets can still be seen to this day. Highlands which have been made rugged by the action of the ice in the past form several of the beautiful areas in Britain to which thousands of tourists go every year; North Wales, the Lake District and the Highlands of Scotland are all glacial districts.

THE TYPES OF ROCKS

Apart from looking for archaeological sites it is a good idea to try to notice, as you travel around, the different types of country through which you pass. Try to find out what kinds of rock underlie each area and observe the kinds of plants and trees that grow on them.

The bulk of British rocks are sedimentary which means that they have been laid down under the sea or deposited by wind. These events occurred hundreds of millions of years ago, against which man's evolution, completed in the last two million years, seems trifling.

As we have seen, when the sedimentary rocks were deposited the material that was dropped on the sea bed had been derived from existing land surfaces (Fig. 2 top). Some of the most ancient rocks which survive in Western Britain are exposed through erosion. These rocks were existing sedimentary deposits or relics of the volcanic layer that formed an early crust of the earth. Sometimes the pressure of molten rock lying deep beneath the earth's surface becomes so great that it breaks out finding its way through lines of weakness. These disturbances will produce volcanoes, or if the pressure is not too great the molten rock will cool below the surface. If the overlying rocks become eroded away later the harder *igneous* rocks will remain standing above the surrounding countryside. Bodmin Moor and Dartmoor are massive examples of this activity.

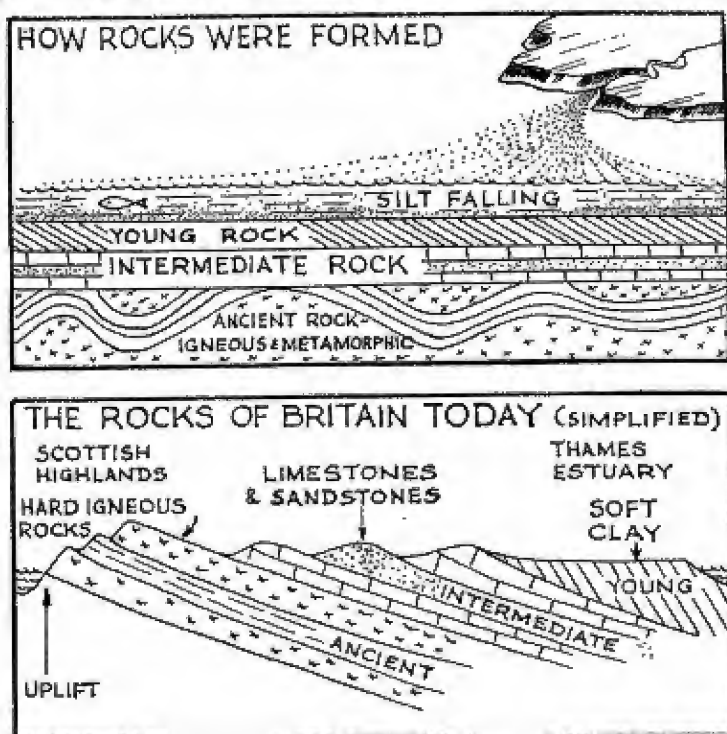


FIG. 2. The Rocks

As a general rule the older volcanic rocks of Britain are to the north and west (Fig. 2, bottom). Lying over them are the sedimentary rocks which are progressively younger towards the south-east. This is because Britain has been tipped up at the north-west corner, and here the constant levelling action of erosion has revealed the deeper underlying rocks. In the south-east they still lie covered by the later sedimentary formations.

There are many different types of sedimentary rocks formed in varying zones of the sea. Rivers can carry their load of silt only when they are moving fast, and when they enter the sea this material sinks to the bottom the heaviest particles first. The deposit nearest to the land is the sand, dropped as soon as the river loses its speed on entering the sea. Clay particles are carried further out as they stay in suspension longer. Deep seas many miles from land are too far away from river mouths to receive sand

and clay, but in this zone limestone is deposited. Pure calcium carbonate dissolves out from the shells of sea creatures and is re-deposited on the sea bed together with some whole shells which become incorporated in it.

As the land becomes eroded away the depth of the sea becomes less as material builds up on the sea bed. On the shore and in estuaries the relative positions of land and sea change as more silt is laid down. In other places however, the sea may encroach on to what was formerly land, for example, where the sea batters against the cliffs or where gradual sinking of the land is taking place.

Examples of this shift can be cited from East Anglia. The Roman forts of Burgh Castle and Walton Castle were both built as shore forts. Walton is now under the sea, a short distance from the shore, but the waterfront at Burgh has been completely silted up by the River Waveney and the castle is now surrounded by dry land. This has happened in the 1,600 years since these buildings were erected. From this we can get some idea of the scale of changes over the millions of years of geological time.

THE EFFECT OF UNDERLYING ROCKS ON SURFACE VEGETATION

The nature of the underlying rock determines to a large extent the type of soil lying upon it, and this in turn determines the type of vegetation growing in the area. Coarse-grained rocks such as sandstones and gravels produce a light, well drained soil on their surface, but the fine-grained ones, especially the clays, produce heavy soils which have a tendency to become waterlogged. Chalk and limestone have a special type of thin soil on their surfaces. This is due to the breaking down of the rock by weathering. Most of the rock dissolves and is carried away in solution. As chalk is almost pure calcium carbonate, there is very little insoluble clay-like material left to make the body of a soil. On gritstone and granite moors the thinness of the soil is due to the resistant nature of the rock to weathering.

A sandy or chalky soil in the wild state will support only a light forest while heavier soils tend to support a more substantial type of forest consisting of the large deciduous trees, particularly oak. It will be obvious to anyone who has tried to walk through forest of these two types which would be the easier for prehistoric man to deal with.

In an area of well drained light forest a hunter would find it relatively easy to clear tracks, set up small huts and chase animals for food and clothing. On the waterlogged clays it would be absolutely impossible to fell any but the smallest trees and the

undergrowth would tend to be completely impassable.

Until the Iron Age the population of Britain was confined to coasts, river banks, chalk downs, sandy heaths and the upland moors of the north and west. With the coming of iron we will see a gradual shift of habitation from these areas to the richer but hitherto impenetrable clay lowlands of the Midlands and East Anglia.

The importance of heavy and light soil can be easily seen if one studies an Ordnance Survey map of the area around Salisbury, on the chalk downs, and that near Chelmsford, on the Essex clayland. The Salisbury sheet is peppered with such terms as "Field systems," "Strip lynchets," "Settlement" and "Tumuli," all denoting early farming settlement. The Essex map, however, shows no evidence whatsoever of prehistoric occupation before the Iron Age.

It was only the coming of the heavy axe and the wheel plough in Iron Age and Saxon times that enabled man to attack the dense forest at last.

It is fortunate for archaeologists that once the clearing had been done the clay soils proved the richer for agriculture. If it had not been so the thousands of early sites that lie on our chalk hills and upland moors would have been destroyed long ago.

LOOKING FOR SITES

You can learn a great deal about archaeology by keeping your eyes open as you go around. All new sites have to be discovered by people who have an eye for the unusual, and it may be that some undiscovered antiquity is on your doorstep.

Maps showing the distribution of prehistoric sites are an essential part of archaeological work. Some maps, although showing all prehistoric sites known in a region, do not show how much the area was settled by early man. Instead of this they show how observant were the various archaeologists working at different places. Like anything worth doing looking for sites is not easy, but if you undertake it in a methodical way, you will no doubt before very long find new sites and make a real contribution to archaeology.

The best way to become familiar with the kind of features that indicate prehistoric activity is to make a point of looking at recognised sites. Most of these will probably be earthworks consisting of the footings of buildings, defensive banks and ditches, trackways and burial mounds or barrows. These will be marked on the one inch to the mile Ordnance Survey maps and are well worth seeking out. If you wish to study an area fairly intensively

the two and a half inch to the mile maps, also published by the Ordnance Survey, will contain more detailed information. Maps covering large areas such as those produced for motorists are of little use in this work.

The chalk downland is ideal for an introductory study of this kind. As we have seen, it was here that early farming people settled. The sites have not been subsequently destroyed and the land does not encourage the growth of obscuring woodland. It is therefore easy to see any slight irregularity on the gently rounded slopes.

In the Bronze Age, the Iron Age and in Roman times it was the custom to cultivate small squarish plots known as *Celtic fields*. The frequently used term "Celtic" in this context is unfortunate as only the late Bronze Age and Iron Age folk are really entitled to the name.

If the surface of the hillside has been disturbed by digging or ploughing then the loosened soil will move down the hillside at a much faster rate than the surrounding ground. The resulting increase in the rate of hill creep on a Celtic field produces a small level terrace on the side of the hill. On the lower field side there will be a raised step. On the uphill side a depression will be formed as a result of the soil's moving away from the field edge. The artificially produced steps are called *lynchets*, the uphill one being referred to as a "negative lynchet" and the downhill one as a "positive" (Fig.3).

Usually the amount of variation between the natural hill slope and the surface of the field is so slight that it is not visible in normal conditions. The effect is accentuated, however when the sun's rays strike the surface of the ground very obliquely in the early morning and late evening when the sun is just above the

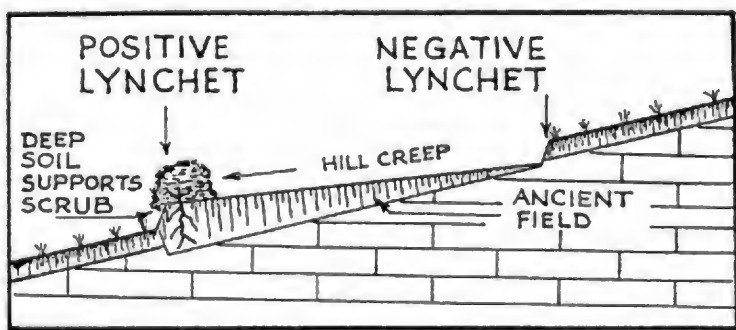


FIG. 3. How Lynchets are formed

horizon. The long shadows cast render the lynchets much more easily discernible (see Fig. 4). In favourable conditions not only the field system can be seen but also the levelled platforms for huts

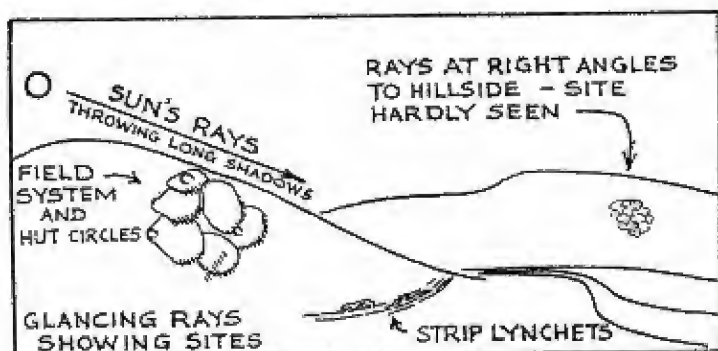


FIG. 4. How to See Celtic Fields

and pathways will stand out. At midday when the sun is high in the sky not a trace of these features is visible.

Most amateur archaeologists will conduct their field work on foot but if it is possible to get high above the area being studied a much more general and complete picture of the landscape will be seen. Before an archaeologist begins to dig a site he usually obtains several aerial photographs of it taken when the sun is at various

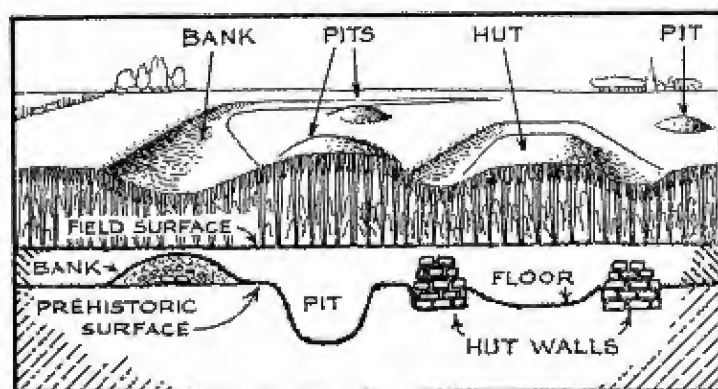


FIG. 5. Crop-marks in a Field

angles to the ground. These are carefully studied so that as many features as possible are discerned before excavating. In this way valuable time is not wasted in digging barren ground.

Particularly easily seen from the air are *crop-marks* (Fig. 5). These are similar features to lynchets but are formed by rather different agencies. To go back to our chalk lands; anyone who has been on them knows that, as on the moorlands in the north and west of Britain, the grass covering them is stunted. This is because the soil has not much depth. Plants that grow on thin soils are not able to develop long roots or obtain water for growth in dry spells. So in a dry summer, vegetation will grow and die off quite quickly due to this shortage of water. On deeper soils where plants' roots are able to penetrate to lower levels the cycle of growth will be slower. More water will be retained by the soil and the vegetation will be able to grow taller and resist being flattened by the wind, thanks to the better support of longer, deeper roots.

Prehistoric farmers dug deep holes to support the posts of their houses and looms, and also pits in which they kept grain and other food or which they used as rubbish dumps. Their dwellings were often surrounded by palisade fences and ditches. Since the structures have all disappeared the post holes have gradually filled with leaves and earth. These holes and ditches provide localised areas of deep soil in which plant growth is more prolific than elsewhere. Sometimes these crop marks show up clearly and many important archaeological sites have been discovered in this way. In some cases the whole layout of a farm or a Roman villa is visible and it is possible to draw the plan of the buildings without having to dig at all.

An amazing effect of the difference in soil depth is the way in which plant species show distinct preferences. Not long ago I noticed on Salisbury plain a difference in colour between the plants growing over a barrow ditch and those on the surrounding undisturbed ground. Over the ditch there was a preponderance of corn poppies and yarrow, whilst on the undisturbed ground were masses of deep blue bell flowers. The ditch was clearly seen as a red area among the surrounding blue.

Of course it is very important to be able to distinguish between modern and ancient soil disturbances and many an archaeologist has been misled in this way. On one occasion a circular patch of very short grass was noticed on an aerial photograph and great excitement ensued until it was discovered that the farmer had had a goat tethered to a post in the centre of the circle and the animal had eaten all the grass within its reach.

The earthworks of the various periods in the past all have their

own characteristic forms, and a mere study of the lay-out, size and shape of them can lead an experienced person to give the monument a date even though no artifacts, that is objects made by man, have been found. However, once it has been decided that an earthwork is prehistoric a careful hunt on the surface of the ground can yield scraps of pottery, bits of worked flint and bones which may give further clues as to the exact purpose and date of the earthworks. Molehills are very well worth examining, and if the ground has been ploughed it is rare not to find something of interest. By making frequent visits to the same site a range of bits and pieces can be found which tell their own story of the weapons, tools, food and even habits of their users of long ago.

Rain will help you find relics. The best time to search is just after a shower when the ground has been washed clean and pieces of flint and pottery show much more clearly through having a film of water on their surfaces. This can have its disappointments though; it is rather like pebbles on the beach which look so beautiful when wet with spray. When the precious stone is taken home and allowed to dry it loses all its lustre and looks quite dull and uninteresting.

Having found a site and studied the artifacts from it, the next problem is, will the excavation of this site add anything significantly new to archaeological knowledge? If it can, and enough labour and money is available it may be decided to dig. The question then is, "Where to dig?" Most sites are far too large to uncover the total area involved, and as a result only limited excavations can be undertaken. If, for instance, the site is a farm the ground plan of the farmhouse or dwelling hut is a priority, and much of the surrounding yard may have to remain untouched. Often settlements span a considerable period of time and to obtain evidence of this a trench through the bank and ditch around the yard will be required. It is therefore a great advantage to be able to locate these features from the ground or from an aerial photograph.

Possibly the most important aspect of digging is to know as much as is possible about the period of time to which the site belongs. History, especially the written records of contemporary observers, if they exist, will be invaluable. A good example of close co-ordination of historical records, shrewd field observations and purposeful excavation is Sir Mortimer Wheeler's excavation of the great Iron Age hill fort of Maiden Castle in Dorset. This town, defended by massive multiple banks and ditches, lay in the path of the Roman legionaries when they were attacking westward across southern England soon after the Roman conquest in A.D.43. The commander of the Second Augustan Legion was Vespasian, who

was later to become Emperor. The Roman writer Suetonius said that Vespasian captured twenty strongholds. As Maiden Castle was one of the largest forts and so heavily defended it seemed probable that the Romans attacked it. The two gateways to the east and west of the fort were both cunningly defended by overlapping banks and ditches. The problem that faced Sir Mortimer was which gateway to excavate as he had not the resources or the time to excavate both of them. The east gate although strong was not quite so heavily guarded as the west and he decided that if the Romans attacked the fort it must have been at the east gate. His clear thinking was rewarded. He found, not only the constructional details of the fort but also Roman weapons and Iron Age sling stones in profusion.

Just outside the gate the Romans had fired the native huts and inside the defences he found a war cemetery where the victorious Romans allowed the inhabitants to bury their dead. One of the skeletons still had in its backbone, the head of an iron ballista bolt.

Even if one is not going to direct a major dig of this kind a good understanding of the various elements at work, now and in the past, will help you to gain an eye for the land so that you can see clearly aspects of the countryside that others without this knowledge would be unable to appreciate.

Looking for the traces of early man will take you to many unfrequented spots. A deserted heath, a field or wood, or a busy town pavement may once have been the home of a half starved Stone Age family, the scene of an elaborate pagan funeral, or even the road along which Constantine the Great travelled on his way from York to Rome when he was proclaimed Emperor.

As well as looking on the surface of the ground you can make use of other peoples excavations, especially farmers', builders' and your local council's. Newly cut or cleaned drainage ditches along field banks and lane sides have revealed the first signs of many archaeological sites.

A ditch may cross a Roman Road and the compact, lens-shaped mass of stones making the crown of the road may be jutting out from the ditch side. If a ditch cuts through a prehistoric site then possibly pottery fragments and flint tools may be revealed.

One of our most important Middle Stone Age sites, at Star Carr, in Yorkshire, was found in this way. This site and several others in the Vale of Pickering were discovered by regular observation of newly cut drainage ditches in the marshy ground. A local archaeologist noticed that flint tools and flakes were sticking out of the side of one of the dykes. He investigated further and realised that he had made a major discovery. He was not able to tackle a

large excavation himself so he informed the archaeological department of Cambridge University who undertook, with him, a very extensive excavation.

Even if you live in the middle of a town, there are plenty of opportunities for you to find unusual remains in the most unexpected places. So much building is going on these days, and much of it requires very deep excavation for foundations. A great deal of the early history of our cities and towns lies under the old buildings and only now are we able to get at the underlying layers in which Roman and Medieval levels are preserved. If you get the chance, keep a look out on building sites and excavations for drains and cables.

In recent months friends of mine have found in the London area Stone-Age axes, Roman Pottery, medieval shoes, eighteenth-century clay pipes and coins, and other bits and pieces from almost every period. The people who regularly find things know exactly what they are looking for and learn to recognise them at a glance.

Recently a group of archaeologists went one Sunday afternoon to see if anything remained of a Roman villa that had been found many years ago. The area is now deeply scarred by chalk pits. They did not find much of the Roman villa, just a few fragments of pottery, but the great finds of the day were some flint flakes made by man, lying in a river gravel on top of the chalk.

Today they and many others are excavating at weekends a riverside spot visited by Old Stone Age men over 100,000 years ago. Here were dropped many tools and chips of flint, a few of which were found and recognised for what they were. Had that field trip not taken place this important Stone Age site would have passed away unnoticed as mechanical excavators were about to chew away the gravel for building.

BOOKS TO READ

Britain's Structure and Scenery (Stamp), Collins.

Natural History of Man in Britain (Fleure), Collins.

Archaeology in the Field (Crawford), Phoenix House.

A Guide to Prehistoric England (Thomas), Batsford.

A Guide to the Prehistoric and Roman Monuments in England and Wales (J. Hawkes), Chatto and Windus.

Ancient Fields (Bowen), British Association for the Advancement of Science.

CHAPTER III

GOING ON A DIG

LET us assume that you have arranged to go on a dig. In Chapter X the various ways of going about this are dealt with. We will assume that you have chosen your dig, have been accepted by the director and are wondering what to expect and what things to take with you.

First of all it is possible that the diggers will be camping on the site as the nearest village may be some way off. If this is so it is essential that the camping equipment is wholly adequate, even above ordinary camping standards as the digger is not camping out just for the fun of it. Digging usually begins at nine a.m. and it may be six p.m. before work stops for the day. Usually the conscientious digger has had enough by then, and the last thing he wants is to return to a heap of damp inadequate bedding. There is no need to go into detail about the art of camping as very informative books are available at any library.

You may be going to a dig where all meals are provided and where sleeping accommodation is in a proper building—this is the exception though rather than the rule. On most digs where camping is essential one must be prepared to take a turn in various chores.

As most digs take place in the summer when insects are at their most active a bottle of insect-repellent can be most useful.

The tools required on the dig are in two categories. First, there are those provided by the director: spades, forks, picks, and wheelbarrows, which are too heavy and cumbersome for the volunteer to be expected to bring. (These things, as well as the surveying equipment, are usually borrowed by the director from a large body such as the local council or museum.) Secondly, there are those which the volunteer is expected to take with him. A pointing trowel—a 5-inch one which has the blade and tang cast in one piece is best (Fig. 6). The riveted variety tend to come apart and the blades usually bend. These are best avoided. A small hand-brush is essential so that loose soil may be removed as trowelling progresses. The

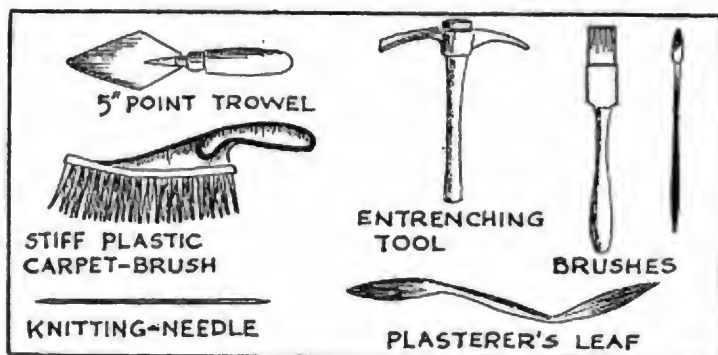


FIG. 6. Useful Digging-Tools (not to scale)

best type is a stiff nylon carpet-brush. A bristle brush will tend to wear and become clogged with earth. A useful tool that may or may not be provided on the site is a small hand-pick which if used with discretion will save much time and energy. These can still be picked up for a few shillings from ex-government stores.

The ex-American Army entrenching tool is very useful as it can be used for lifting turf as well as serving as a pick. In a surprising number of digs, one finds that the director has failed to provide an efficient turfing tool. Without a good cutter it can be most wearing trying to drag up the turf with one's bare hands and a blunt spade. If one is not careful it is very easy to get blistered hands and sore knees after only one day's digging. Some diggers scorn any kind of protection, but for ordinary mortals a cheap pair of gardening gloves and a kneeling pad will save much time spent nursing honourable wounds.

Although small coal-shovels and buckets are usually supplied, bitter experience suggests that there always seems to be too few of them. If it is possible to take these to a dig you will be able to stay friends with everyone.

For extracting small delicate finds small brushes and probes are useful. The most suitable brushes are the 1-inch and $\frac{1}{2}$ -inch house-painting brushes and for the most delicate work a number 6 water-colour brush is best. For probing a steel knitting-needle serves the purpose admirably, and for both probing and delicate scraping a plasterer's leaf, though expensive, is a joy to use. All these small tools can be kept most conveniently in a canvas roll.

Having assembled your personal equipment you will not want to lose it. The best way to mark your own gear is by burning your

initials wherever possible. On wholly metal tools a painted coloured spot will serve the purpose, though it will tend to wear off eventually. The reason for marking your equipment is not so much to prevent theft as to enable the diggers to sort out what belongs to whom at the end of a day's work.

The person upon whom responsibility for the dig rests is of course the director. As with subordinates in any organised operation, those under him are there to do exactly as he wishes. A dig is not a democratic process, it is more akin to a military campaign. Do not expect the director to be very sympathetic about your own personal problems as he has probably a thousand greater problems of archaeology, management, and good relations with the local folk on his mind.

On large digs the director appoints a number of site supervisors, to lessen his own burden. They are responsible for the work in each section and at the end of each day they are required to write up a "day-book", as will be described later in this chapter.

Sometimes it is thought funny to bury modern objects in someone's trench—usually by the dig buffoon or nuisance. This type of prank is to be avoided. It is as old as the hills and can be, if it misfires, a cause of much trouble.

On most digs beginners are most welcome and although they usually start by pushing a wheelbarrow, they are soon taught the rudiments of excavation. Sometimes, however, the learner may find himself in the embarrassing position of being led to a trench, handed some tools, envelopes and trays and told "Just carry on taking it down." To the initiated this is a straightforward order but the beginner will need to know quite a few things before he can confidently excavate.

The whole technique of excavation is designed to give as complete a picture as possible of the various archaeological layers of the soil and of their relationships with each other. For this reason digging progresses downwards, clearing one layer at a time (Fig. 7 top right). As far as possible the true archaeological or natural layers are cleared one after the other. These natural layers are often slanting and if a trench is dug with a strictly horizontal floor the material from the different layers is likely to become mixed. This will lead to false conclusions being drawn from the evidence.

As the work proceeds the various layers are labelled from the surface downwards by means of tags attached to the trench side. These give a description and number to each layer. All finds from any particular layer bear its number so that there can be no doubt as to where they come from.

As archaeological excavation is essentially destructive it is im-

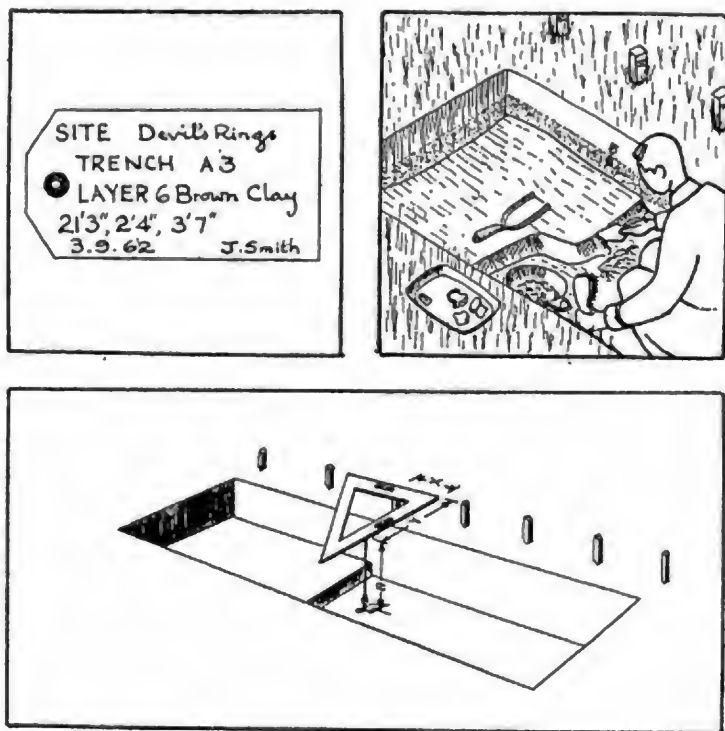


FIG. 7. The Technique of Excavation

perative that everything should be recorded meticulously, including the little things that may seem insignificant at the time. When the director brings together all the evidence at the end of the dig it is often the little things that throw light on problems which at the time of excavation seemed insoluble.

The artifacts which usually occur in the excavation of later prehistoric sites will usually consist of a considerable amount of pottery and a much smaller number of other objects. As there is so much pottery all the fragments, or *sherds*, from any particular layer are put into one tray as they are unearthed. At the close of the day the pottery is washed and put into brown paper bags. These bags are most carefully labelled with the details of the site, trench, layer, date and digger responsible. The trays are then cleared ready for the next day's work.

The other finds, called *small finds* as distinct from the pottery, are recorded in greater detail. Alongside the trench, one foot from the edge there should be a row of reference pegs set in position before digging started. These are most carefully positioned, being a set distance apart. Their heights above a set datum are determined by surveying. When a small find is made its position, relative to one of the pegs, is measured in three directions (Fig. 7, bottom sketch).

- x. Along the edge of the trench.
- y. In from the line of pegs.
- z. Vertically downwards.

These measurements are easily made by means of a large set-square and a plumb-line. The square has to be a rather special one having small spirit-levels in both operative sides so that it can be held exactly horizontal. A suitable size for the square is to have the two arms three and four feet long and the hypotenuse five feet.

The recorded co-ordinates of the find will then be the sum of the co-ordinates of the peg from which the measurements were taken and the individual measurements of the find-spot. As soon as it has been *measured in* the find should be placed in a strong bag or envelope which should be clearly labelled with the same information that is put on the pottery bags, plus co-ordinates, after the layer number and description (Fig. 7, top left).

The information obtained from a dig is entered in one of four record books.

The *trench-book* has a list of trenches being cut and the details of the various layers and structures. To the trench description is added a list of the serial numbers of the pottery and small finds bags.

Small finds and pottery bags are also listed in separate books. The *bag list* need only have entered the numbers of bags in serial order, together with the appropriate trench and layer numbers. The *small finds list* must be more comprehensive, containing all the information entered on the individual labels. To avoid confusion with all the various sets of figures entered on labels and recorded in books, a code convention is used. Layer numbers are put in a *circle*, small finds numbers in a *triangle*, and bag serial numbers in a *square*.

As well as the purely technical notes the director or site supervisor completes a *day-book* in which he enters the progress of work during the day, the nature of the structural finds and any ideas and observations which occur to him or to any of the diggers.

The day-book, as well as the other books must be kept up meticulously, otherwise scraps of information vital to the interpretation of the site will be forgotten.

The technique of excavation, like any manual skill, is learnt much more easily by following an expert demonstration, than by reading about it. A few guiding principles put down here will, I hope, prevent the reader, if he is a beginner, from making a bad start and possibly missing much evidence in the process.

The first essentials are tidiness and method. As we have seen the trenches should be dug in layers and so the digger must train himself to be acutely aware of a layer change whether it be in colour or texture. In order to see what is coming out one should, wherever possible, work with the undisturbed soil away from one and carefully ease the earth forwards (Fig. 7, top right). More often than not the depth of a layer is greater than the depth of the trowel blade, in which case excavation should be in shallow spits about four inches deep. Start a spit at the end of the trench, here you will have to kneel on top of the layer you are excavating, which is not desirable. As soon as about two feet have been cleared you can then stand in the lowered step and work forwards.

As you remove the earth, sweep the floor of the newly dug spit with a brush, and put the soil in a bucket for removal to the dump. Do not pile up a great mound of earth before thinking of putting it in the bucket. Take great care to keep the sides of the trench square, especially right in the corners. To shave down the side of a trench later to make it square is not good practice as important finds may fall from the side before you can notice the layer from which they came. Resist the great temptation to pull pieces of pottery and small finds out of the face of the trench. It will wreck the appearance for photography and is liable to cause falling of the trench side. Also it removes those objects that should be seen in a photograph of the section.

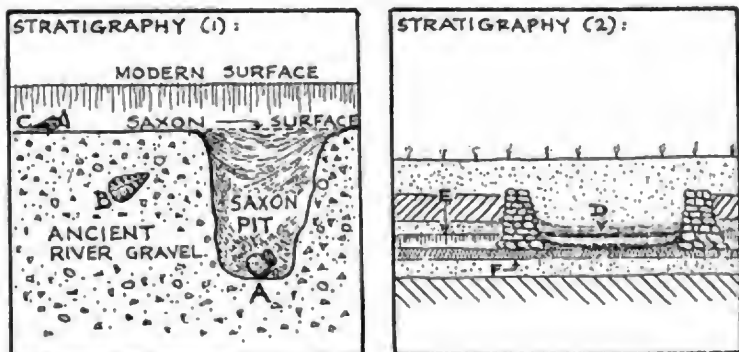
Do not dig more than one layer at a time or use heavy picks and shovels unless you are absolutely sure that it is correct to do so. It is very easy when using heavy tools to hack through several layers at a time and to miss many small finds.

The problem of where to make the dumps of earth will not be left to the beginner. The guiding factors are essentially twofold. The most galling thing to have to do is to remove tons of earth from one dump to a fresh one some distance away because the site to be examined next lies under the dump. If in doubt, the rule here is to keep the dumps well back from the area being excavated, even if this does mean longer barrow runs. This will automatically look after the second factor which is to allow room for good photo-

graphs to be taken. Nothing looks worse on a photograph of a dig than great heaps of earth about to tumble back into the cuttings.

It is a rule on all digs never to stand or sit on the edge of trenches. Always walk at least a foot from the edge. This will prevent the collapse of the sides of trenches which have been carefully cut so that they can present a clean section for drawing and photographing. If the barrow run has to be along the *baulk* or ridge of unexcavated ground between trenches, it will help to have a series of planks to push the barrows on and so reduce the wear on the baulk.

Whilst we are dealing with do's and don'ts, don't arrive at the dig wearing hob-nailed boots as these will crush to pieces any delicate objects in the trench and churn up the layers. Rubber-soled shoes are usually the rule.



(FIG. 8)

The sequence of archaeological layers relies for the most part on the simple geological rule that things are deposited with the oldest layer at the bottom and the younger ones on top. Having said that it is only right that I should point out that archaeology, like geology, is in actual fact anything but simple. The natural forces of erosion and Earth movements plus the work of animals and man have served to disturb and mix up the straightforward layered sequence, sometimes to the point of inverting them.

A cave at the bottom of a hillside may have two distinct layers in it, which contain relics of the Bronze Age and Old Stone Age periods. Normally the Bronze Age layer would be on top of the older Stone Age one as it was laid down much later. It is possible, however, for the Stone Age layer to be uppermost. This may happen

if the makers of the Stone Age tools did not inhabit the cave but the hillside above. Gradually the topsoil together with the tools will creep down the hillside and may eventually come to lie on top of the Bronze Age layer.

A very simple example of this type of stratigraphy is shown in Fig 8, left. The pot at A, although at a deeper level than the hand-axe at B is nevertheless many thousands of years younger than it and is roughly contemporary with the glass vessel C, lying on the Saxon surface. Similarly, the floor D in the hut (Fig. 8, right) is not directly associated with the layers outside at E but instead is dated by reference to layer F which is common to both inside and outside the hut. Working from this layer the dates of the layers inside and outside the hut must be worked out separately, each layer being dated by reference to the objects found in it.

The recognition of layers and the understanding of stratigraphy is not learnt from books, however, and it takes years of regular digging to acquire a good eye and to understand these features.

It goes without saying that when on a dig or simply doing field observation it is imperative to obey the code of the countryside and to respect the wishes of those who depend on it for their livelihood. The various points can be listed, shutting gates, not walking over growing crops, keeping dogs on the lead amongst livestock, etc. All these points add up to general courtesy. If it is borne in mind that farmers farm for their living and not as some sort of amusing diversion, thoughtless behaviour will not occur.

BOOKS TO READ

Archaeology from the Earth (Wheeler), Penguin.

Beginning in Archaeology (Kenyon), Phoenix House.

Field Archaeology (Atkinson), Methuen.

Surveying for Archaeologists (Fryer), University of Durham.

CHAPTER IV

THE OLD STONE AGE

WE use the words "Ice Age" often, and loosely, but what exactly do we mean?

Properly, it is more accurate to speak of an "Ice Advance" or "Glaciation." An Ice Advance is a time when huge sheets and tongues of ice push out from the cold highland masses and grind their way over thousands of square miles of the previously warm lowlands. As the ice fronts advance they rapidly wear away the rocks over which they move. The loose stones and gravel are carried forward with the ice.

Actually, there have probably been four ice advances in the Northern Hemisphere in the last six hundred thousand years, and there is evidence of many more before them (Fig. 9). A Yugoslavian mathematician called Milankovitch has estimated that these four advances occurred:

570,000 years ago (called the Günz Glaciation).

455,000 years ago (the Mindel Glaciation).

200,000 years ago (the Riss Glaciation).

70,000 years ago (the Würm Glaciation).

He did this by calculating the possible variations in energy we received from the sun during this period, owing to the irregularities in the earth's orbit.

Archaeologists are particularly interested in the dates of these ice advances as this is the period of time when man was in the most primitive state of physical development and technical attainment. This "Palaeolithic Period" or "Old Stone Age" was so vast that the last four ice advances quite certainly occurred within it.

You will hear experts refer to remains as "Riss Glaciation" for example, or "Mindel-Riss Interglacial" (by "interglacial" they mean the warm period between the two ice advances).

In tropical regions, particularly Africa, evidence of wet periods,

or "pluvials" and dry "interpluvials" are found but the correlation between these and the European glaciations is not yet clear.

In the interglacial periods the climate in Europe varied between sub-tropical and cool temperate. This caused the type of vegetation to alter with the temperatures. During a glaciation the type of forest in Britain changed from a Mediterranean type to a sub-arctic tundra and back again.

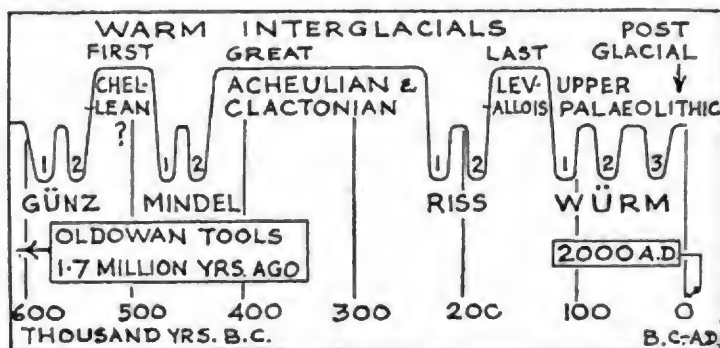


FIG. 9. The Last Ice Age (simplified)

In the hottest phases animals such as the hippopotamus, rhinoceros and elephant roamed Northern Europe. As the temperatures varied, the northernmost limit of each animal's range altered. During a cold period the warmth-loving animals could only live as far north as North Africa whereas in a warm spell they spread into the British Isles.

One of the animals affected in this way was Man, who was just beginning to emerge as a true human. If we find man's remains in conjunction with those of animals and plants we can tell the type of surroundings in which he lived and also estimate a rough date in relation to the glacial and interglacial phases. By reference to Milankovitch's work it is possible sometimes to date archaeological remains in terms of years but only to within about 50,000 years.

We still do not know when the Palaeolithic period really began. The very fact that it is so long ago means that most of the evidence in the form of stone tools and bones has been destroyed.

Man's capacity for making tools places him far in advance of most of the animals. Apes will make irregularly shaped stone tools and wooden clubs to serve the purpose of the moment, but man, by making his tools to a regular pattern, shows himself capable of having preconceived ideas. This means that he must have an

advanced co-ordination between brain, eyes and hands.

This special accomplishment is as yet the only hard and fast indicator we possess when trying to classify early remains of man and other closely related man-like forms of life, and it can be very difficult to decide whether a few bones can be classed as those of a proper tool-making man or those of an ape.

Darwin stated, in 1859, that he considered man and the apes to have a common ancestry. Most archaeologists today accept his theory that man has evolved from the same animals as the monkeys and apes. Modern man is much more similar to ancient fossil forms than he is to modern monkeys. It seems that from these fossil creatures there were two distinct lines of development, one leading to man and the other to monkeys and apes. The split must have occurred millions of years ago as it would take that time for monkeys to develop the special features they show today.

The fossil that is nearest to both man and monkeys is called *Proconsul africanus*, and comes from Lake Victoria. It was a tiny monkey-like creature, smaller than a chimpanzee, and the shape of the arms, legs and skull was very primitive. The bones showed features ancestral to those of modern monkeys, apes and man. The form of the face has not the rugged appearance of apes and monkeys, but yet the jaw was far from human.

It was unfortunate that since the late nineteenth century the popular image of early man has been that of an "ape-man," the so-called "missing link" between man and the apes. This misconception is due to several causes, in particular the lack of understanding of Darwin's ideas which were misconstrued by others who thought he meant that man was descended from modern apes.

The work done recently in Africa by several distinguished archaeologists has enabled us to understand this early phase much more clearly. Dr. and Mrs. L. S. B. Leakey have been working regularly for many years at a very exciting site in Tanganyika, called Olduvai Gorge. The gorge is many miles in the bush, and the party of diggers have to carry with them literally everything they will need for the digging season. All their water has to be taken in tanks and the whole operation has the organisation of an exploratory expedition.

The gorge cuts through a huge series of layers of rock laid down at the bottom of an immense lake which sometimes became dried out to form a desert. The layers are in a sequence with the oldest at the bottom, and human remains have been found in several levels. This site is ideal as we can trace the development of tool making from its earliest beginnings, right up to the stage when man had the skill to make stone implements which, besides being very

efficient, had a certain elegance of shape. It seems that man enjoyed his new-found skill and took a pride in producing perfect specimens which are much more beautifully finished than was absolutely necessary.

What makes this site so very important is that Dr. and Mrs. Leakey have, after years of searching, at last found the actual skeletons of some of the makers of the tools. It is hoped that they will be rewarded further still and eventually be able to show us a complete sequence of skeletons with their tools. If this proves possible we will at last know a great deal about the origin of our species.

One of the Leakeys' most instructive finds is that of *Zinjanthropus boisei*, the so-called "Nutcracker Man". The shattered skull and a leg bone of *Zinjanthropus boisei* were discovered by Mrs. Leakey, who saw the upper jaw sticking out of the gorge side. After meticulous excavation they were able to suggest that *Zinjanthropus boisei* died at the side of the lake, with his tools and the remains of his last meal of small animals strewn about him.

He is especially interesting as he comes from one of the very lowest layers at Olduvai. At this stage man was just beginning to use his brain to supplement his hands and teeth which were rather ineffective against the tough skins of animals. Unlike the gorilla he had no long vicious teeth to rip open his food and no claws like the cats. Instead he had well controlled hands and the intelligence to split a pebble and so produce a cutting edge. This was the very act which made him different from all the rest of the animal kingdom, and made possible his advance to becoming the controller of his environment.

The earliest tools that they have found at Olduvai consist of fist-sized pebbles which have had several flakes chipped from two opposing sides to produce a jagged cutting edge (Fig. 10, top left). The smooth rounded butt opposite the cutting edge makes an admirable hand-hold. These pebble tools are named "Oldowan," after those found at the type site of Olduvai Gorge. Progress by man in this period was extremely slow and this is reflected in the very gradual advance in the basic tool type. Man slowly realised that the pebble tool would function as a chopping, piercing and pounding implement if it were made more pear-shaped.

In the middle and upper levels of Olduvai Gorge these more advanced tools called hand-axes are found (Fig. 10, top right). In these levels there are round stone balls which may have been tied onto long cords so that they could be hurled at animals to entangle their legs. This way of catching running game was used on the South American pampas and stones used in this way are

called "bolos stones." Some of the hand axes are specialised in having squared off ends. It has been suggested that they were used as cleavers or splitting tools for dealing with intractable materials such as wood and bone.

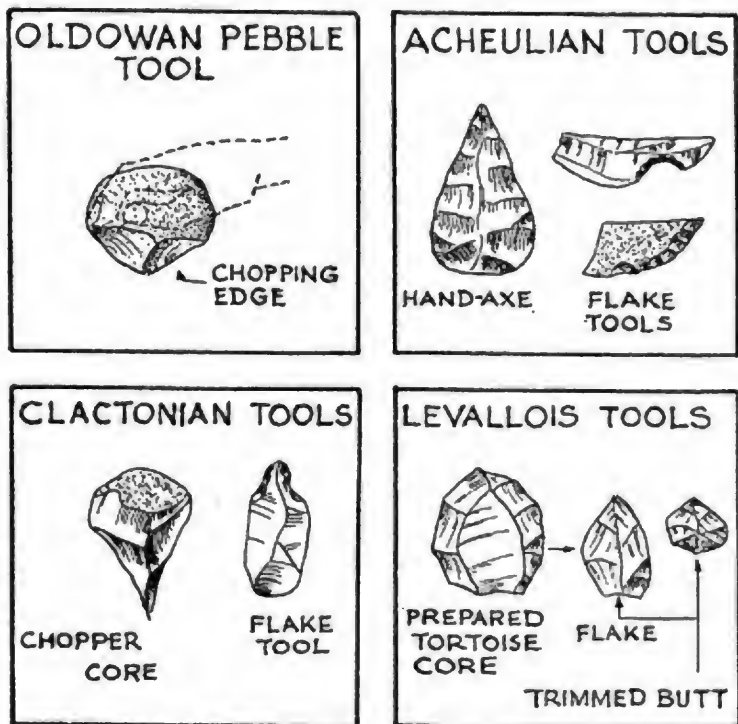


FIG. 10. Palaeolithic Tools

From their probable origin in Africa hand-axes spread outwards to places as far afield as India and Britain. They are known to have arrived in Britain by the end of the Mindel Glaciation. The hand-axes and pebble tools, being made by trimming nodules of stone, are called core tools. The flakes that were removed were usually discarded but a small proportion were trimmed to make small flake tools that were used for scraping and cutting (Fig. 10, top left).

In Asia and Europe flake tools were more widely used and core tools had a somewhat minor role. The well known Pekin Man, about 300,000 years ago, manufactured many crude flake tools of

quartz with which he dismembered the animals he had dragged to his cave.

Britain, as well as being on the outer edge of the African core tool industries, was at the western limit of the flake industries of the Far East. The type site of the flake tool industries of Britain is Clacton. The so called Clactonian industry is fairly widespread in southern Britain (Fig. 10, bottom left).

The now famous holiday camp at Clacton is in fact situated over the riverside hunting-ground of palaeolithic man.

Palaeolithic tools cannot be found just anywhere but only in the sort of places to which a primitive hunter would be attracted. The most favoured spots were river banks. The rivers afforded easy transport and a good supply of readily worked flint, and the banks were ideal places to lie in wait for animals coming to drink. When

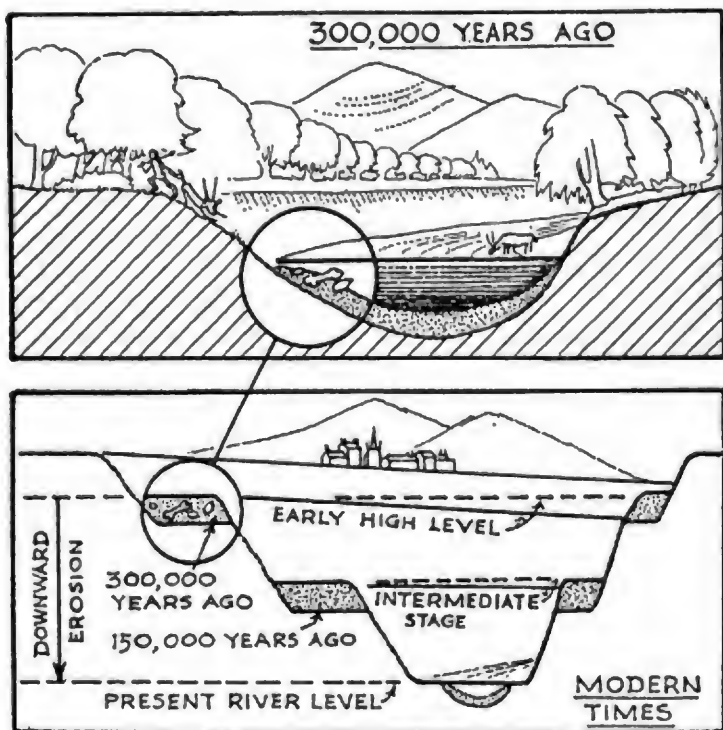


FIG. 11. River Terraces

an animal had been killed it was no doubt dismembered on the spot with the help of a freshly made flint tool. The better cuts would be carried back to camp and the blunted flint knife would be discarded on the spot. Eventually the knife would probably be washed into the stream and incorporated in the bed together with chips of flint and broken bones (Fig. 11, top).

RIVER TERRACES

As we look for Palaeolithic remains in river sands and gravels we need to know something about river terraces and how they were formed.

The action of a river on its bed is regulated by the speed of its water. If the gradient of a river is steep the water will flow fast and the river will abrade its bed. Over very long periods the general gradient of a river from source to mouth may alter because of rises or falls in the level of the sea.

Thus during times when the level of the sea is low rivers tend to cut down their beds, but when the sea level is high the water speed is slower and silt from the river is deposited (Fig. 11, bottom).

Low sea-levels occur in cold phases such as glaciations when large volumes of water are locked up in the ice sheets. Conversely when the ice melts in interglacial warm periods the sea-level will tend to rise. In these warm phases large sheets of gravel are deposited in river valleys and these are called river terraces. The term "terrace" is due to the fact that these gravel spreads are stacked one above the other on the sides of our river valleys. Each terrace corresponds to a warmer period between two colder ones. The oldest terraces are at the top and the youngest ones are at the bottom, nearest to the present level of the river.

The observant reader may well ask why it is that these interglacial spreads are not all at the same level but show a gradual downward trend. The answer to this question cannot be given conclusively but it is thought that the bottoms of our ocean basins are gradually sinking owing perhaps to the weight of sedimentary material from the land which is accumulating on them. Apart from oscillations due to changes in sea level and major changes in the Earth's temperature the sea does seem to be getting lower, and with each successive interglacial period it reaches a slightly lower maximum level than at the last.

The terraces of our rivers in north-west Europe are datable to the three major interglacial periods, and by measuring their heights we can date, roughly at least, the archaeological material contained within them.

<i>Approx. years ago</i>	<i>Glaciations</i>	<i>Level of Terrace above Sea-Level</i>	<i>Type of Industry</i>
550,000	Günz.		
	Interglacial	200ft.	Probably none.
450,000	Mindel.		
	Interglacial	100ft.	Clactonian, Acheulian, Levallois
200,000	Riss.		Levallois.
	Interglacial	50 & 25ft.	Acheulian, Levallois, Mousterian
75,000	Würm.		Mousterian.

The names of the industries included in the terraces will be seen on the diagram; these will be explained later in this chapter.

As we have seen man probably began his existence in Africa and spread outwards. In north-west Europe, from the Mindel-Riss, or Great Interglacial, we can discern two flint traditions. The Acheulian consists mainly of hand-axes with some flake tools (Fig. 10, top right). An earlier, cruder hand-axe phase called Abbevillian or Chellean precedes the Acheulian, but the evidence for it in this country is slight. The Clactonian phase is mostly flakes with some "chopper cores" (Fig. 10, bottom left).

From a gravel terrace of this Great Interglacial period at Swanscombe, Kent, comes one of the finest sequences of Acheulian hand-axes and also part of the skull of one of their makers. From the fragments we possess it seems that Acheulian man was very modern in appearance but unfortunately the vital face bones are missing.

At the close of the Great Interglacial very specialised flake tools appear. The aim of their makers was to produce, in one blow, a perfectly serviceable flake that needed no retouching. This technique is called the prepared core technique, and the industry that developed, the Levallois (Fig. 10, bottom right). This industry became common in the Riss glaciation and the Riss-Würm Interglacial.

NEANDERTHAL MAN

Towards the close of the last, or "Riss-Würm" interglacial there appeared the famous Neanderthal man whose remains have been found in caves in many parts of Europe.

For some reason, not fully understood by us, Neanderthal man

was much more stocky than modern man with long arms and a stooping posture. His head was flattened and heavily built with bone ridges over his eyes. These features gave him a superficially ape-like appearance, but he was a true human with a large brain and a capacity for making very fine stone tools. He specialised in making scrapers, points, and curious disc shaped cores. The stone industry of Neanderthal man is called "Mousterian" after the cave in France where many typical tools were found.

He seems to have had some sort of religion as many skulls have had the hole at their base enlarged artificially. Perhaps this was done so that the relatives of the deceased could scoop out the brain. It is possible that they ate the brain in order to gain some of the powers of the dead person, for example, skill in hunting. This form of cannibalism has been practised by primitive tribes until quite recently.

At a cave called Drachenloch in Switzerland we have evidence of a cult of the cave bear. Bear skulls had been piled up at the back of the cave facing the entrance. In front of this were two stone boxes one of which contained six bear skulls again facing the entrance of the cave and in front of these was a hearth.

Man in the remote periods had to retreat to warmer regions when the ice sheets advanced, though he gradually seems to have become able to cope with more rigorous conditions. By the advent of the Würm glaciation he had enough control over his environment to live in Europe even though the ice fronts advanced, due to his improved equipment. Perhaps the greatest advance was the regular use and control of fire. With it man could withdraw to the shelter of a cave mouth and use the fire, not only to warm himself but also to keep away wild animals.

From the beginning of the Würm glaciation it is to caves and not to river gravels that we must look for remains of man. Of course not all gravels, even though they are of the right period, will contain Stone Age flints. Primitive hunting people tend to congregate at the animals' watering places, and it is here that we may expect to find the tools and weapons of man.

To find Palaeolithic remains much patient searching must be undertaken in the gravel pits and exposures that exist in ancient river terraces. If you live near a sizable river and would like to do some searching, a six inch to the mile geology map of your area will be most helpful as on a map of this scale the *drifts* are shown. (Geologists call all superficial deposits of the last Ice Age by this name.) Get to know the Palaeolithic tool types by visiting a good museum and it will prevent you from bringing home many curiously shaped but naturally formed stones.

A word of warning needs to be given here. Gravel and sand are very unstable materials and the sides of newly worked pits, although ideal for searching, must be watched most carefully as they can suddenly fall in without warning. Pits are dug mechanically these days and the grabs scoop below the water-table. Some pits are filled to quite a depth with murky water. This, combined with their steep and crumbly sides and often remote siting, means that they are very dangerous, especially to children. These facts are well known to the pit-owners and it is little wonder that they do not encourage casual visitors. If you want to look at a pit go and see, or write to, the owner for his permission. By working with the owner you can often gain information and material from the workmen who know the place intimately and who are usually very willing to keep a look out for unusual things.

Any finds you make should be carefully labelled with the name of the pit, date and level they come from. For example:

Johnson's Pit,
30.1.62
Coarse lower gravel.

If no obvious stratification exists, then the height from the base of the pit is a second best. Keep a sharp look out for animal bones and teeth as they will help to date the deposit and also indicate the environment in which men lived at the time. You should show your finds to an expert who will know just how archaeologically important they are, if the site is known in professional circles, and whether a further investigation is warranted.

An excavation in a gravel-pit will have its own peculiarities. Physical danger ranks high in its problems and due to the unstable nature of gravel the side of the trench will have to be made to slope. Even so, to prevent the trench from slumping in, the sides must be stepped back about a yard every three to four feet down.

The level of the finds will need to be recorded carefully especially with regard to actual layers. The plotting of finds on a horizontal basis is not so important, as at most gravel sites the flints have been rolled from where they were originally dropped. Only if a true undisturbed workshop were being studied would this type of recording be necessary.

Digging Palaeolithic sites is hard work as much gravel has to be moved. As these sites are so rare it is not advisable to start digging unless a large, well controlled excavation is possible. However the amateur can be of the utmost importance in finding sites and noting down details of deposits before they are quarried away.

CAVES

Cave research these days is a very specialised study as the deposits are very complex. Since they have a romantic appeal many of our British caves were dug in the nineteenth century in a very unscientific manner. This means that all our major caves have had most of their archaeological levels removed. What little undisturbed deposit remains is very precious.

Being away from the main area of habitation in the period, our caves were only visited occasionally when hunting bands ranged far to the north of their usual areas. This being so, the number of flint and bone tools of this period from all our caves put together is far less than those found at a single site in the classic area of central France.

Almost all caves of any size are in limestone areas, and were formed by water long before man arrived on the scene (Fig.12). If you look at the areas of carboniferous and magnesian limestone on the ten inch to the mile geological map you will be picking out the areas of later Palaeolithic finds in Britain. These are the Mendips, the Derbyshire Pennines, Wales and Devon.

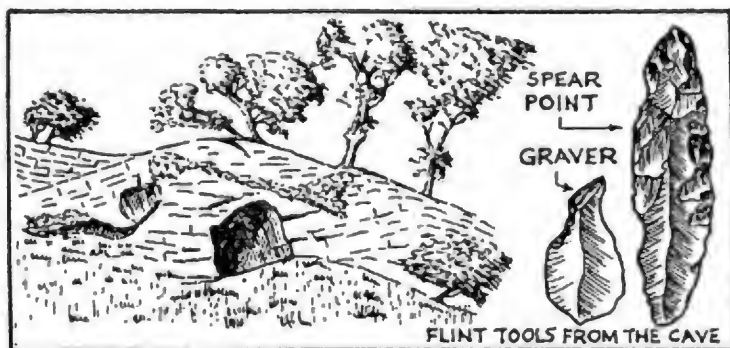


FIG. 12. Ffynnon Beuno Cave, Flintshire

As we have seen, man at this period, with the aid of fire, was able to withstand the "tundra" or sub-arctic conditions of a glacial phase. The occupation levels are usually found just at the cave entrance where shelter from the weather could be had. Men did not live in the deeper more mysterious recesses as it would have

been too cold and dark and also they could have been easily trapped by cave bears or lions, but the caves were visited in order to make the well known cave paintings of the period. These arresting works of art probably had a specific purpose, and the drawing of spears and what look like pit-falls among the animals suggest that the artists hoped to increase the hunters' chances of killing the game. This use of "sympathetic magic" is still used in primitive tribes today. The rarity of human figures also suggests that there was a taboo against drawing one's friends as this might lead to their being overcome by the magic themselves.

The types of hunting tools were very advanced and varied. Bone javelin-points, harpoon-heads and fish-gorges are common, and with them a multitude of cutting, slotting and sawing tools made of flint are found.

By this time man had developed his modern appearance as the famous old man of Crô Magnon, found in a rock shelter in South-Western France, has shown. The dead were buried in the floors of the shelters, and surrounding them were heaps of shells, some of them pierced for necklaces and bracelets. Often the bones of the dead were spattered with red ochre, which may simulate blood and indicate some rudimentary religion.

Sculpture in bone and stone was practised and, as well as animal carvings, the presence of small statuettes of women of ample proportions suggests a fertility cult of some sort.

The many differing groups of people at this time seem to have had in common flint tools made from long, narrow flakes; in particular, graters or *Burins* are very characteristic (Fig. 12). Because of this, the group of industries are called the blade and burin cultures. The term "culture" may be used here as we have sufficient evidence of the people's tools, homes, and art to be able to reconstruct their way of life reasonably fully.

In Britain flint tools are found and with them, occasionally, some bone tools. Only a couple of carvings have been unearthed, one of a man and the other of a horse, coming from Cresswell Crags in Derbyshire, but unfortunately the possibility of forgery cannot be ruled out in either case.

Our caves contain far less archaeological remains than the great Upper Palaeolithic sites on the continent. Against the great painted caves of Lascaux and Altamira in France and Spain and the massive rock shelters of the Laugeries in Perigord, our best sites at Cresswell, Cheddar and Torquay look trifling. This, instead of detracting from their importance does just the opposite and means that only absolute experts should attempt to dig them.

BOOKS TO READ

Adam's Ancestors (Leakey), Methuen.

Meeting Prehistoric Man (Von Koenigswald), Thames and Hudson.

The Old Stone Age (Burkitt), Bowes and Bowes, Cambridge.

On the Track of Prehistoric Man (Kühn), Hutchinson.

Fossil Men (Boule and Vallois), Thames and Hudson.

Man the Toolmaker (Oakley), British Museum of Natural History.

Flint Implements (Watson), British Museum.

CHAPTER V

THE MESOLITHIC PERIOD

VERY gradually, as the last ice sheet receded, the climate of Europe improved. This period of time, between about 14,000 and 4,000 B.C., is referred to by scientists as "*post-glacial*" or "*neothermal*" time.

The sequence of the climatic changes which followed the ice retreat has been worked out by a study of the trees that grew at the time. The various species can be identified by the technique known as "*pollen analysis*". Trees produce millions of pollen grains every summer which will be preserved, if they fall into a lake or peat bog, in a stratified sequence. By studying the pollen of the various tree and plant species present in each layer we can reconstruct the living forest with its grass, shrubs and trees. The percentages of pollen grains of the different species show us which trees were commonest at any particular time.

We know that the tundra round the glacier's edge gave way to a light forest of pines and birch. About 5,000 B.C., conditions were warm enough for the heavy deciduous trees, elm, lime, alder and particularly oak, to spread northwards and to overwhelm the earlier forest. They so blanketed the land that the thick vegetation was to exclude man from our clay lowlands until the coming of iron (Fig. 13).

In the post-glacial period we see that man was unable to rely on the large animals for food. The bison, mammoth, reindeer and wild horse had left North-West Europe with the disappearance of the ice and in their place came the small forest animals that we know today, red deer, roe deer, pig, marten, fox and beaver.

Essentially man lived much the same life as his Upper Palaeolithic forefathers, and the daily round must have been very similar. But the change of the vegetation and forest animals is reflected in his hunting equipment and habitation sites. From the bones found we can trace the gradual shift of man's dependence on reindeer for food, leather, antler horn and bone to his dependence on red deer instead.










POST-GLACIAL TIMES-BRITAIN		
DATE B.C.	FOREST	PEOPLE
A.D.-B.C.	WET PEAT BOGS	ROMAN IRON
1,000	DRY E	BRONZE AGE 
2,000	WARM	NEOLITHIC 
3,000		
4,000	WARM & WET 	UPLAND & SAND SITES 
5,000		
6,000	MIXED OAK FOREST WARM & DRY	M A G E L E M O S E 
7,000		
8,000	BIRCH & PINE COLD (DRYAS) MILD 	
9,000		
10,000	BIRCH COLD DRYAS 	OLD STONE AGE 

FIG. 13. The Post-Glacial Period

We find remains of Mesolithic man under peat bogs, in caves and on sand dunes, beaches, upland moors and sandy heaths. Where fishing was the main stay of the economy barbed bone points are common. These were used either singly as harpoons, or grouped together to make the head of a pronged spear, rather like a trident (Fig. 14). Until recently this same method of fishing was used for catching eels in the River Severn, a fork with barbed prongs being employed. These weapons are called "leisters." Other items of fishing equipment such as bone fishing-hooks and nets with cork floats are found in the sites of Mesolithic fishing folk.

If we look at the camping site of a group of Mesolithic people

living on an upland moor we find the relics of light but deadly hunting equipment together with hearths and, very occasionally, rings of stones which may have held down a tent.

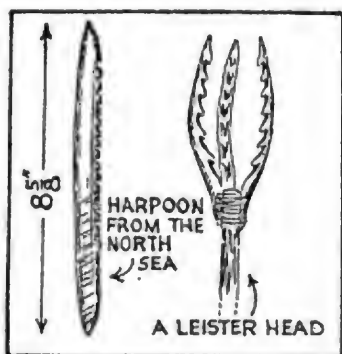


FIG. 14. Harpoons

One common feature links the people in all Mesolithic groups. They all made tiny, carefully worked flints that often are geometric in shape. These minute flints called "microliths" were used to make composite tools, which consisted of bone or wooden shafts set with flint barbs or knife edges (Fig. 15).

Harpoons could be barbed with the triangular type of microlith, whilst the rectangular form if fixed to a shaft end to end would make a most effective knife.

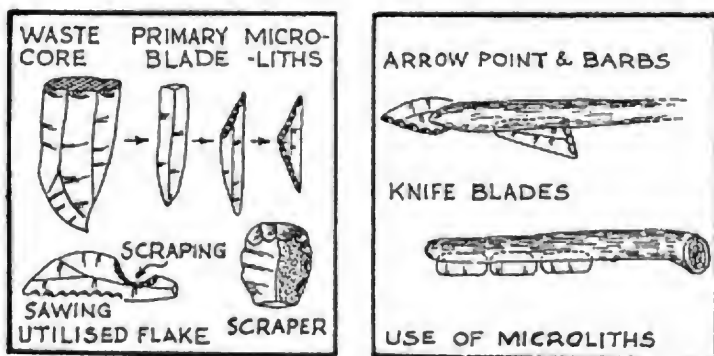


FIG. 15. Mesolithic Tools and Weapons

To make microliths, blades were struck from a small core of flint. They were then worked into the shapes required. The secondary working on microliths is usually very steep, and was intended to blunt and not to sharpen the edge. The blunt edge would therefore be mounted in the handle, leaving the untouched, razor-sharp edge protruding.

The sites found by the sea usually consist of the remains of people living by collecting shellfish. At Ertebolle in Denmark, the most famous of these sites, a large "kitchen midden" has been left by them, consisting of a heap of shells a hundred yards long by twenty yards wide. Kitchen middens of this period and later occur on the coasts of the British Isles and Scandinavia. Fish hooks, bone combs, flint tools, pounding stones for opening shellfish, and the bones of semi-domesticated dogs have been recovered from these middens. From the Island of Teviec, off the coast of Brittany, human burials of this period have been found. The inhumed bodies were sitting upright in a pit. They were covered with antlers and daubed with red ochre.

In the area of Oban in Scotland, caves were occupied and middens of shells were left on the shore. The caves and middens are now all about twenty-five feet above the present sea level. This is because since Mesolithic times the north-west of the British Isles has been gradually rising out of the sea as the ice has melted away. In this area there are ancient beaches which were washed by the sea in Mesolithic times but which are now twenty-five feet above sea level. From these sites some interesting harpoons have been found which are typologically similar to ones from the Pyrenees. Whether they are directly related, or whether they show parallel development under similar conditions, we are not sure.

Archaeological finds from under peat bogs in both Britain and Scandinavia are so similar that they have been given the collective name, the "Maglemosian" culture, meaning the great peat bog culture. As well as harpoons, leister prongs and microliths, small flint axes are common. These were probably used to fell trees and they indicate man's first attempt to clear the forest that enveloped the land.

At an early Maglemosian site at Star Carr in the Vale of Pickering, near Scarborough, an artificial platform had been built out into the lake. As well as the usual equipment parts of deer skulls were found with the antlers attached. These had been thinned to make them lighter and were also provided with four holes. It can be concluded that they were head-dresses worn either to decoy deer, or used in some ritual dance, presumably to in-

crease the fertility of the animals and the skill of the hunter.

Another remarkable find from Star Carr is that of the domesticated dog. Dogs have not been found on the sites of the Upper Palaeolithic period, but they do come from the Maglemosian sites on the Continent. Star Carr is the earliest Maglemosian site known, being some 7,500 years B.C., and even at this early stage the dog was well domesticated. We must look therefore in the Palaeolithic period for the first stages of domestication. At about this time farming was first being practised in the Near East and domesticated dogs could conceivably have been obtained by the Mesolithic hunters of north-west Europe from these more developed societies. The whole question remains a mystery.

Two other famous Maglemosian sites in Britain are at Broxbourne on the River Lea and at Thatcham on the Kennet. At both these places, situated on marshy flood plains, we can see, even today, how the country must have looked in Mesolithic times. Forest animals, water fowl and fish were the basis of the economy. Both excavations showed that the Mesolithic bands had camped on ridges of gravel that were sticking out into lakes. Since Mesolithic times they have become enveloped in peat, and the flints and bones are beautifully preserved in a well defined layer directly on top of the gravel and under the peat.

From the east coast of Yorkshire have come several barbed points of the Maglemosian folk. One find made at Hornsea in 1932 shows how an exciting relic of the remote past can be found unexpectedly by anyone. A man was walking with his dog on the sea shore just after high tide. He looked around for something to throw that his dog could run and fetch. He saw what appeared to be a stick protruding from some seaweed, and picking it up he felt that it had a series of notches along the side. Realising it was something unusual he took it home, and it was later recognised as a Maglemosian barbed spear-head.

Another similar spear-head was discovered in 1931 in an even more unusual way. The trawler *Colinda*, fishing twenty-five miles off the Norfolk coast, dredged a huge lump of peat from the sea bottom. This happens fairly regularly in this area, and the presence of peat on the sea-bed shows that, in place of the stretch of sea between England and Denmark there was once land. When the lump of peat brought up by the *Colinda* was broken apart out came a barbed spear-point of Maglemosian type (Fig. 14).

This remarkable find shows that Mesolithic men of about 6,000 B.C. were able to live on the ancient land surface now covered by the North Sea. The find from the sea-bed suggests that there must be many more sites out to sea, especially off the north

coast of Holland which is in the centre of the known Maglemosian area, stretching from Russia to Britain.

At the same time as the Maglemosian fishermen were living by the waterside in Eastern Britain another group had settled on our moors and heaths. These people lived by hunting rather than fishing and the shapes of their flints, especially their microliths, are quite different from the Maglemosian ones. Moreover no bone harpoons have been found, but this may well be as a result of their destruction by the acid nature of the soils that these people seem to have preferred.

Usually the only traces left are clusters of very tiny microliths and waste flint which represent temporary camping sites. These sites occur in East Anglia, on the Pennines and on sandy soils generally.

On the high moors of the Pennines the flints are found in concentrated patches not greater than four yards in diameter and they lie below the peat of more recent times. The presence of these Mesolithic hunting camps on the high inhospitable moors, and their absence in the valleys below is a dramatic reminder of the shift of settlement due to change in climate and man's technological advance. In Mesolithic times, about 6,000 B.C., the moors would have been lightly wooded with birch, pine, oak, alder, hazel and some elm and lime. The gradual spread of peat bogs on these moors from about 5,500 B.C. put an end to hunting in the upland areas and drove men to settle in the valleys. The peat smothered the ancient sites but we find them today where it has been stripped off through erosion, revealing the Mesolithic land surface.

The association of early man with sand and other light soils is very marked in the Weald of Kent and in Surrey and Sussex. In this area alternate bands of sand and clay outcrop on the surface, and in prehistoric times different types of forest would grow on them. On sand pines and birches would grow whilst on the clays, oaks and elms flourished along with much undergrowth. As with the riverside areas of Thatcham and Broxbourne, so the Weald can also give us today a vivid impression of the conditions that prevailed in Mesolithic times.

If we look up the places where Mesolithic flints have been found on a geological map, we will notice the close correlation between the geology and the places where Mesolithic man chose to live (Fig. 16). His territory was exclusively on the sandy ridges, not far from a suitable water supply. The patches of Mesolithic flints are often strung out along the sides of a stream.

In the Wealden area we have actual hut sites made during the Mesolithic period. At Abinger, near Dorking (Fig. 17) one hut of



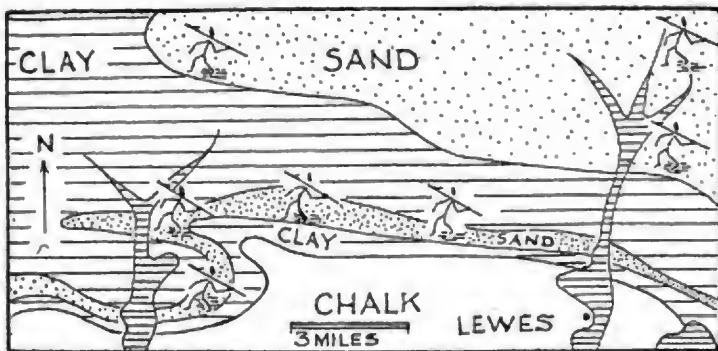


FIG. 16. Mesolithic Sites and Geology

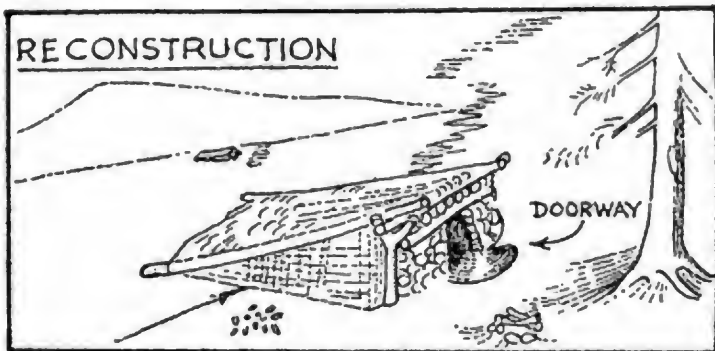
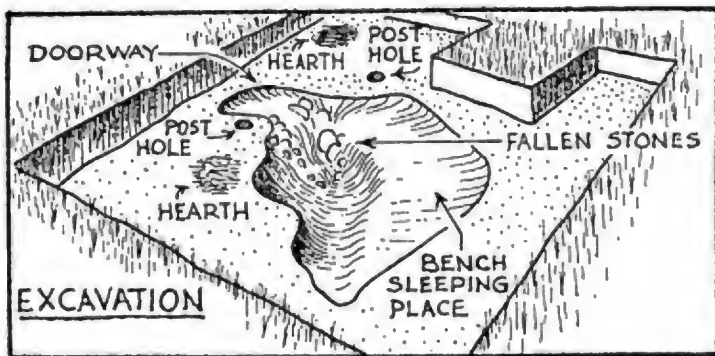


FIG. 17. Mesolithic Hut—Abinger Common, Surrey

a small village has been excavated. The floor was dug out of the sand and the remains of a small wall round the doorway, postholes and hearths were found. This semi-subterranean dwelling seems typical in the Weald and the ease with which man could excavate his hut floor is another reason why sandy sites attracted him.

Small flint axes are also found in the Wealden group and the idea of making them was probably borrowed from the Maglemosian fishermen. Also from this area, the Hampshire basin and the West Country come siltstone pebbles which have a similarity to the "limpet hammers" from the Scottish middens. There are two problems though. The pebbles are found on inland sites as well as shore settlements, and therefore would not be used to crack shellfish open. They are all of a similar rock which geologists tell us could only have come from Devon. As they are all of this same stone, it appears that they were brought to the Weald from the West Country by man. Why he should want to bring them so far remains an unsolved problem.

Looking for Mesolithic flints is a very enjoyable hobby and takes us to many of the most beautiful parts of the country. This is a good way for you to start field archaeology whilst gaining an understanding of flint working and the principles of typology. You will be doing no damage, and if you show your finds to an expert you will be making a positive contribution to archaeology. A word of warning though: don't become an expert in one field to the exclusion of others. Too often I have met amateurs who knew all there was to know about certain narrow topics of archaeology, such as Mesolithic flints or clay pipes, and nothing else. By all means make a close study of a particular topic but be aware of the other periods as well.

As we have seen, sand areas are liable to be most profitable. On the poor acid soil pines, birches and gorse usually predominate. The ten or six miles to the inch geological maps will be useful for locating the right areas. If you have neither of these you will be able to find likely spots by looking for heaths and commons on an ordinary map.

Like all flint-workers the Mesolithic folk produced much waste material in the manufacture of their finished tools. Like the Upper Palaeolithic people before them they first made blades, by striking them off a core. From these primary blades the various tool types were manufactured by secondary working. On a Mesolithic site waste flakes and parent cores abound in profusion, far outnumbering the finished tools that were discarded or lost.

It is important to collect waste flakes as well as obvious finished

tools, especially if you are a beginner. The recognition of actual tools is quite a skilled business, and in your "waste" you may well have something that may be recognised only by an expert. You will only be able to acquire this skill by reading the specialised books on this period and by visiting museums to see what you are really looking for.

I have often had brought to me boxes of treasured flints of the period which an earnest collector fondly imagined to be full of perfect tools. Upon examination all except one perhaps are found to be waste, and that one is only a crude scraper. In the waste box, however, several burins or graters turn up which had not been noticed by the collector.

By looking carefully at the waste flakes you may be able to find a few flakes that fit together. If this occurs you will be able to reconstruct exactly how the Mesolithic man set about flaking the flint to make the tool of his choice.

If you do start collecting Mesolithic flints the rules are roughly the same as those of the Palaeolithic period. Record exact find-spots and the date and, what is very important, every now and again show your finds to an expert. The site may be well known but it may not. In either case it is most important that you know exactly where all the flints have come from.

You may also unwittingly find a very unusual object which needs to be recorded together with its present whereabouts. This will prevent a sad repetition of what one sees so often in older books. An object is illustrated and underneath is written, "Found by Rev. J. Smith 1894, now lost".

As the more usual Mesolithic camping sites have resulted in a spread of material over a wide area, excavation should be aimed at recovering as much of the material as possible, plotting horizontally the more important objects. Microliths which show the cultural connections of the industry with others, waste cores showing flint knapping areas, hearths and possible hut footings will need to be accurately plotted. The number of waste flakes is often too high to plot each one individually and a "dot distribution diagram", each dot representing five or ten flakes will be best. This plotting of waste material indicates living areas.

To excavate a wide area of a single spread of material the transect method is often used. In this the area is divided into squares like those on a chess board, and alternate sections are dug. When they are completed they are filled in and the adjacent sections are dealt with. By this method barrowing and section drawing are made easy, and the site which may be large is broken down into manageable units. If another archaeological layer is found below

this it can be dealt with by the usual recording and excavating methods.

On sand sites most organic material is destroyed. Recently, however, it has been found that pollen grains are sometimes not fully decomposed and that by taking samples of the soil being excavated the forest sequence in the area can be reconstructed.

A very misleading feature of acid soils is the formation of hard iron layers or "pans" at different levels below the surface. They are caused by the humic acid derived from the surface vegetation dissolving out the iron oxide as it filters downwards. At well defined levels the iron is redeposited and can often simulate an old land surface very convincingly. The effect is called "podsolisation" and is very common on these sites.

Peat sites are dealt with in the same way but much heavy tackle is usually required to control the water-level. For this reason they are dug only by large professional organisations who can also deal with the sodden wooden objects preserved below the water-level. These fragile remains need very special treatment to prevent them from turning to powder on drying.

As with Palaeolithic sites, enough material must be gathered to obtain a truly representative picture. A statistical approach is being used more and more these days to study the connections that the site may have with others. In this way we can assign our site to a particular culture and so give it a rough date.

BOOKS TO READ

The Mesolithic Settlement in Northern Europe (Clark), Cambridge.

The Mesolithic Age in Britain (Clark), Cambridge.

The Mesolithic of Southern England (Rankine), Surrey Archaeological Society.

A Mesolithic Site at Abinger Common, Surrey (Leakey), Surrey Archaeological Society.

CHAPTER VI

THE NEOLITHIC AND BRONZE AGE

THE technical progress of man, although usually showing a steady development, sometimes suddenly forges ahead with a rapid spurt owing to some exterior driving force. A classical example of this is the way in which, owing to the partial drying-up of the lands in the Near-East, man in postglacial times began to change the basis of his economy from hunting to farming. From caves and open sites in the near-east have come Mesolithic tools together with corn-grinding querns, flint sickle-blades and bones of domesticated animals, sheep, goat and pig. Cattle were domesticated somewhat later.

The mystery of these early farming people is: which came first agriculture or pastoralism? Several elaborate theories have been put forward which are, roughly:

1. Man and animals were driven together at watering-spots and oases and therefore pastoralism came first.
2. Man discovered the secret of sowing and reaping. Animals came and ate the stubble. They manured the ground and so were befriended by man.

The subject is rather like "which came first, the chicken or the egg?" and it is best to just leave it like that.

The term Neolithic, meaning "New Stone Age," is used to describe these earliest farmers and others who learned the new economy from them. The material used for cutting tools was still stone, but axes were ground to a finish instead of being just flaked. The Neolithic people also learned how to make pots by baking clay.

Farming, ground stone axes and pottery were until recently taken as defining the Neolithic economy but now we know that there were groups of people who practised some but not all of these skills, and these are usually grouped under the general Neolithic heading.

THE EARLIEST TOWNS

In the lowest levels of the huge mound of Jericho have been found the remains of very early town building people, dated by carbon¹⁴ (a system which will be explained later) to about 7,000 B.C. A town wall and a tower with an internal staircase were constructed. Inside the wall huts, corn-grinding querns, and storage pits were found. A curious feature of the people of this time was that they made bowls not out of pottery but ground out of solid limestone. Similar evidence has come from other near-eastern places, but as yet Jericho is the earliest known.

THE SPREAD OF FARMING

This new way of life rapidly spread in the Near East to give rise to many highly developed towns and villages and it was not long before farming groups were migrating via the Balkans to central Europe.

We have evidence from pollen analysis that the forests were cut down wherever these people went and that after they had moved on the trees recolonised. Another interesting feature is that they followed, almost exclusively, the broad band of very light soil called "loess" which was deposited in glacial times from the Balkans to southern England. It appears that being only equipped with hoes and digging-sticks these early farmers could only cultivate the lightest of soils. The method they used to obtain fertile land was to clear a piece of forest with their stone axes, burn the fallen wood to remove it and add minerals to the soil. They then cultivated the cleared, enriched area.

When the soil became exhausted a new patch of forest was similarly treated. This made colonisation of new land essential and drove the new farmers rapidly across Europe to our shores.

These "Danubian" people built rectangular wooden houses and dug pits for depositing rubbish or using as pigsties.

The classic site of the Danubians at Cologne has caused much confusion as to the nature of a Neolithic house.

The excavators found the remains of very large rectangular wooden structures together with pits containing domestic rubbish and surrounded by small stake-holes. As there was no scatter of domestic rubbish on the floors of the large structures it was thought at the time that these could not be houses. The excavators then looked at the pits with their rubbish and stake-holes and they decided that these must be the houses. If they were they would have

been semi-subterranean pit dwellings. From further work on Danubian sites it has been concluded that the long rectangular buildings were the houses, and the pits were probably dug to provide daub for the mud walls. These pits then seem to have housed pigs, hence the ring of stakes to fence them in. These sties were finally used as rubbish-pits. The houses probably had wooden-boarded floors and were kept clean, the floor-sweepings being thrown into the pits. Many pits would be needed over a period of time and this is why so many are found on sites of this kind where only a few would be in use at one particular time.

The mistaken conclusion that Danubian folk lived in pit-dwellings lingers on and many books contain illustrations of them.

By this period true pottery, made from fired clay, was in use and many Danubian pots are round-bottomed and provided with lugs for suspension.

THE FIRST BRITISH FARMERS

When these first Neolithic folk came to Britain they sought out the areas of easily worked light soils similar to those to which they had been used. Our sites of this period are almost exclusively on the chalk-lands as the loess deposits in Britain are very slight.

These early farmers in Britain are called Windmill Hill folk after the type site near Avebury in Wiltshire. They are recognised by the characteristic bag-shaped pottery that shows their origins in the Danubian culture (Fig. 18).



FIG. 18. A Windmill Hill Pot

Whilst the Windmill Hill farmers were settling on the chalk uplands, other groups came to our shores, especially to the south and east coasts. These colonisers kept mainly to the river estuaries and valleys and they made a type of pottery which was cruder in many respects but much more heavily decorated than Windmill Hill pottery. These riverside Neolithic folk have been called the

secondary group as distinct from the primary group on our chalk-lands.

However this kind of distinction can be confusing as we are not at all sure which group came here first. It is quite possible that some secondary folk were the first to arrive. Whenever flint tools are found with the secondary group they are of the Mesolithic type or have certain Mesolithic aspects similar to those used by the hunters of the previous archaeological era. It is possible that the secondary folk, by their contact with Mesolithic bands, gradually relearnt how to live by hunting.

NEOLITHIC SITES

Unfortunately the foundations of huts from this period are rarely found in Britain. Chalk is almost pure calcium carbonate which is being gradually dissolved by the traces of carbonic acid in rain-water. This chemical erosion has had the effect of lowering the level of Salisbury Plain one foot since that time and the footings of the flimsy rectangular huts that were built by the Neolithic folk have long since been dissolved away. But huts of this period have been found at Haldon in Devon, Clegyr Boia in Pembrokeshire, and at Lough Gur in Ireland.

The more common relics of this period are the burial mounds or barrows in which several people were buried together. Puzzling circular earthworks called causewayed camps also belong to the Neolithic age and occur in Southern Britain together with flint mines where specially good flint for axes could be obtained. The burial mounds consist of long barrows of chalk covering an enclosed palisaded or wattled rectangular area—the mortuary enclosure, in which the dead were laid out. Sometimes we find the remains of a hut or heavy post structure which was set on fire as the burial mound was built. The interleaved remains of burnt timbers and the chalk of the mound were clearly found at one of these sites at Nutbane in Hampshire.

The folk whose skeletons are found in these barrows were usually of the small, long headed type and the bones often show signs of considerable exposure prior to being interred. It may well be that the bodies of members of a family were left in the open mortuary enclosure until enough had accumulated to make the construction of a large communal barrow worth while. Open or exposed mortuary enclosures have also been found but as yet have yielded very few remains. This is not to be wondered at perhaps if one remembers the fate of the Neolithic hut sites on the chalk.

Causewayed camps occur on chalk country and on the gravel

terraces of our rivers. They consist of a varying number of concentric ditches, usually from one to four. The whole structures are about 1,000 feet across. Between the ditches the ground is flat and it has been suggested that gates were erected between the ditches to form a massive complex cattle kraal. But recent excavation has shown that the ditches were not the primary feature but quarries to obtain material for continuous banks, broken by occasional gateways. This is more logical and simple and makes the kraal theory more sensible.

The presence of many domestic cattle bones at these camps suggests that these places were used as seasonal round-up spots for these essentially pastoral people. One of these camps is at Whitehawk near Brighton, on the site of the present Brighton Racecourse. In one of the ditches the traces of a squalid cooking area were found and near them were the remains of children's skulls and two young women who had been unceremonially buried. This is the only instance that has ever been found of a causewayed camp having been occupied in this unpleasant manner.

A curious feature has recently been found at the causewayed camp of Windmill Hill which makes the mystery of these strange monuments even deeper. In the ditches were found layers of animal bones which had been deliberately thrown in and covered with chalk rubble. From this evidence it looks as though the occupants periodically had a large feast and when they had had their fill they threw their refuse into the ditches. If the causewayed camps are meeting-places to conduct barter after the seasonal round-up the possibility of the pastoral folk having a large feast before they went their separate ways is quite reasonable.

AXE FACTORIES

From Neolithic sites in Southern Britain have come many stone axes which were not made of local flint but of rocks that exist only in the highland zone. Certain rocks behave like flint in that they can be flaked freely in any direction and do not only split along the bedding planes. Being somewhat tougher and less brittle than flint they were eagerly sought after. Four major axe factory sites are known: Langdale Pikes in Westmorland, Penmaenmawr and Mynydd Rhiw in Caernarvon, and Tievebullagh in County Antrim. A factory site must exist in the Land's End area but the actual site has not been located. We know this as many axes of stone from this area have been found.

These axe-manufacturing sites are usually situated on a mountain side where the scree slope provides suitably broken material for

roughing out the basic shapes. From these centres it appears that the roughly shaped axes were traded with Neolithic people many miles away who ground the blanks to the particular shapes they wanted.

It seems surprising that such good lines of communication existed, but bear in mind that the Mesolithic siltstone pebbles or "limpet-hammers" appear to have been brought all the way from Devon to the Weald. It may be that the people who carried on this trade were the Mesolithic groups already in Britain who were familiar with the natural routeways.

The Windmill Hill folk had their own axe-factory sites on the South Downs and in the Breckland area of Norfolk. On discovering a good seam of flint exposed on the surface they would follow it down by mining. Grimes Graves, in Norfolk, an area of Neolithic flint mines was so named because the shafts were associated in the middle ages with the devil.

There are three seams of flint in the chalk at Grimes Graves, topstones, wallstones and floorstones. The Neolithic flint miners cut through the two upper seams in order to get to the floorstones. The floorstone flint was very suitable for the manufacture of flint axes as it occurs in a flat tabular form and so is easy to flake. Another advantage of the floorstones was that by being some forty feet below the ground they had not been affected by frost. The upper two seams suffered frost action which caused very fine cracks to run through the flint. If cracked flint is used for axe manufacture it will shatter in many directions and fly to pieces in the hand.

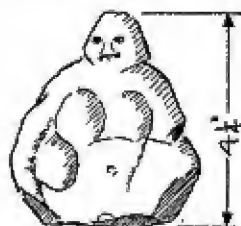


FIG. 19. Mother Goddess from Grimes Graves

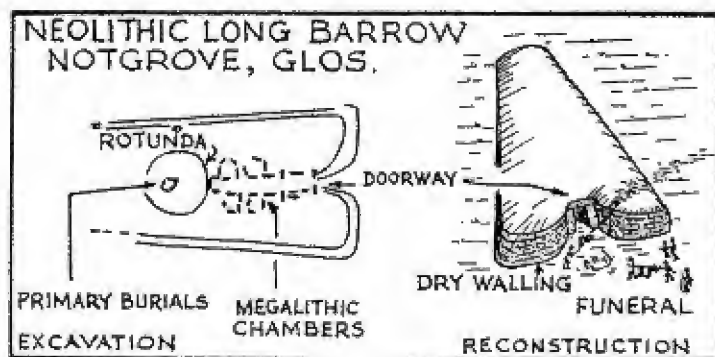
In one of the galleries where the flint seam petered out the statuette of a mother goddess carved in chalk was found and with her were offerings of antler picks and fertility symbols (Fig. 19). She was apparently being petitioned to provide further supplies of flint.

MEGALITHIC TOMBS

At roughly the same time as the Windmill Hill folk were occupying the chalklands of Southern Britain, that is about 2,700 B.C., a second group of people were colonising Britain. Whereas the Windmill Hill people seem to have had connections with France, Holland, Germany and Switzerland, this group had its origins in a more Westerly direction, Brittany, Spain and the Western Mediterranean.

These Western Neolithic tribes were linked by a distinctive feature. They all appear to have had the same kind of burial ritual. The dead were buried in communal tombs built of huge stones and dry stone walling which are called "megaliths". These seem to signify some sense of the dead returning to the earth by way of a dark cave which may originally have been a natural one. Later rock cut tombs were made and later still artificial caves were built of large stones. This ritual has been interpreted as a sort of religion which unified the population and spread ultimately from the Mediterranean to Scandinavia by way of the Atlantic seaboard.

There are many differing forms of these tombs and they have been classified on a typological basis. One group that is centred round the Bristol Channel is called the Severn-Cotswold group and is fairly typical. The early barrows of this group have a gallery made of huge slabs of stone that leads from a doorway to the centre of the barrow. On either side of the gallery are stone built burial chambers arranged in pairs. The bodies of the dead were



(FIG. 20)

put into these chambers in a sitting position, the bones of previous occupants being pushed aside.

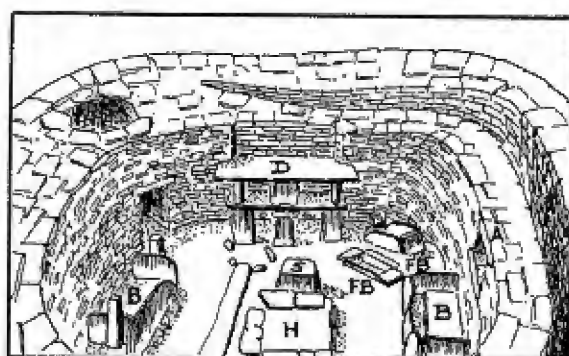
One curious feature of many of these tombs is that there exists in the heart of the barrow, behind the gallery and chambers, a round structure which often shows signs of being the site of a fire. At Notgrove in Gloucestershire (Fig. 20) this rotunda contained another chamber in which were two skeletons. The similarity between this feature and the mortuary enclosures of the unchambered Windmill Hill type of barrow is obvious. These stone structures and their contents may be dedicatory foundation burials placed there before the main barrow was built. The rotunda may show us the actual form and dimensions of the houses in which the western folk lived.

In one of these Megalithic tombs at Lanhill, also in Gloucestershire, a group of people were found who all had similar features—slight build, long, narrow heads and longish noses. So alike were they that the barrow appeared to be the burial vault of a single family. Another curious feature of the skeletons from this barrow was that the foot bones were slightly distorted. It is probable that some kind of sandal was worn which had a strap passing over the foot. Examples of this constriction have been found in other Megalithic tombs.

It can be seen from this example and the hut-like structures found inside the barrows that facts about the life of ancient times as well as of death can be gathered from a study of burial mounds.

SKARA BRAE

In the far north of Britain the weather was too rigorous in Neolithic



- KEY:
- H HEARTH
 - S SEAT
 - B BEDS
 - D DRESSER
 - FB FLOOR BOXES
 - A AUMBRY

FIG. 21. A Neolithic House, Skara Brae

times for trees to grow. The subsequent shortage of timber forced man to build his houses as well as his tombs from stone. At Skara Brae in the Orkneys a storm in 1866 uncovered a complete Neolithic village on the sea shore where it had been covered for 4,000 years by the drifting sand dunes (Fig. 21).

The huts were square in plan with rounded corners. Each had a central hearth, two beds, tanks to hold shellfish and shelves built into the walls. In order to pass through the accumulated midden material round the huts, semi-subterranean passageways led from one hut to the next. We do not know how the little houses were roofed, as wood was not available. There is evidence that the walls were partially corbelled with protruding stones to make them slope inwards at the top. The final roofing may have been supported by whalebones.

It is only very rarely that accidents of geography enable archaeologists to study remains of the past so fully as has been possible at Skara Brae.

THE BEAKER FOLK

Somewhere about 2,000 B.C., weapons of a wonderful new material copper, were being introduced to Britain from the Continent by a group of people who were entirely different from the Neolithic inhabitants. These new *beaker folk* were well built and broad headed and they buried their dead in *round barrows*. To help you distinguish between Neolithic and Beaker people an old mnemonic

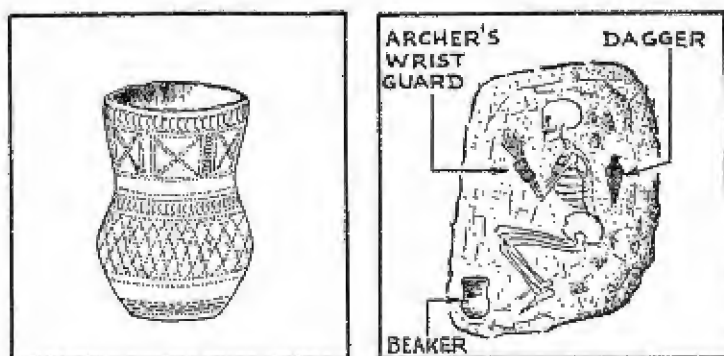
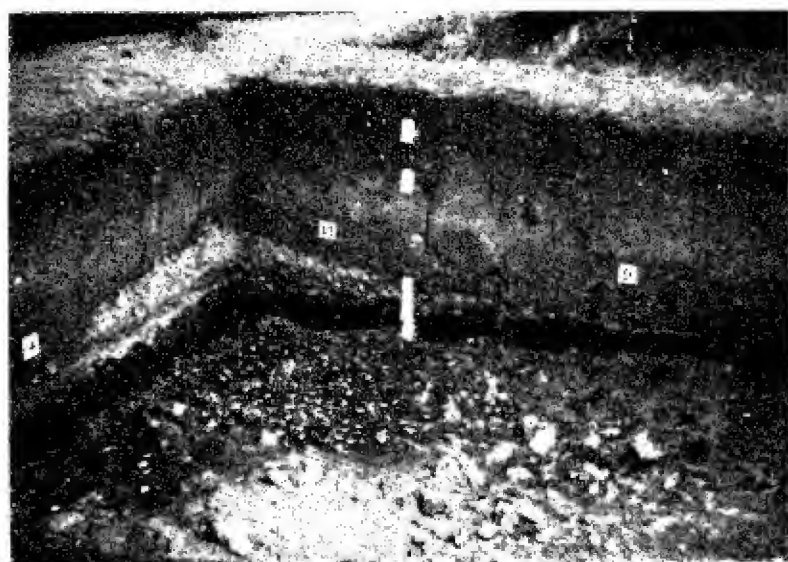


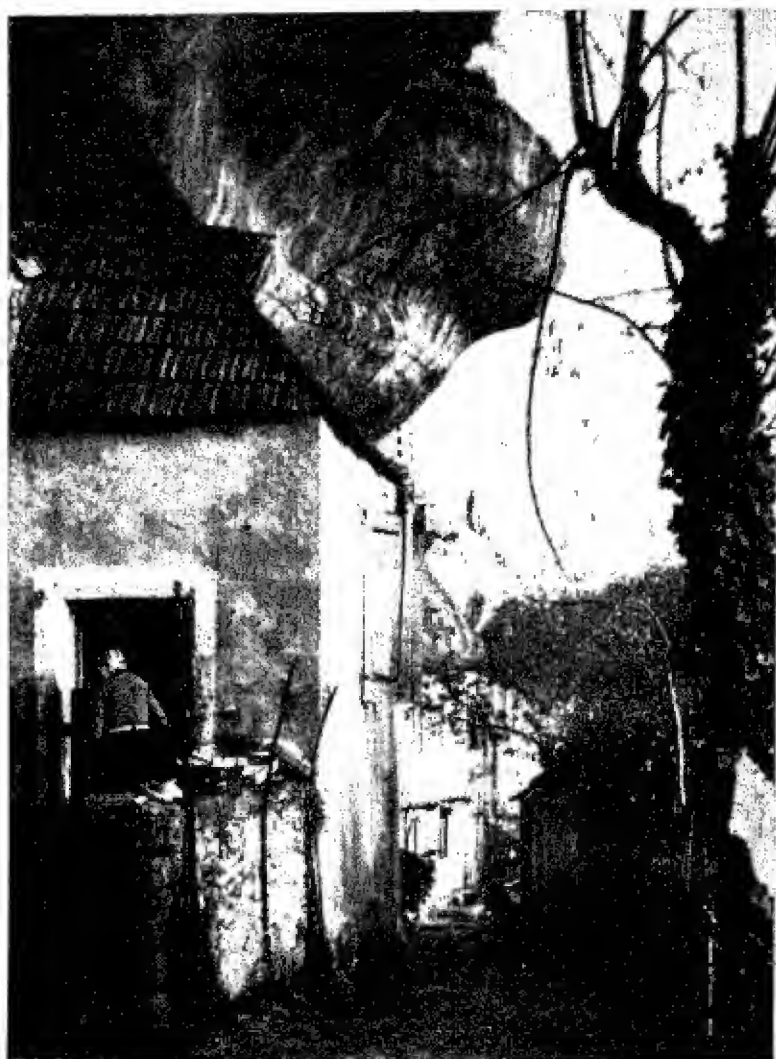
FIG. 22. A Beaker and a Beaker Burial



1. (a) An excavation in progress, Cliffe, Kent.



1. (b) An archaeological section, Thatcham, Berkshire. Lake deposits overlie a Mesolithic floor. Each dot marks the position of a flint artifact.



2. A Paleolithic rock shelter used to this day,
Les Eyzies, Dordogne, France.



3. (a) A Megalithic tomb, Keriaval, Morbihan, France.



3. (b) A Megalithic tomb, Nympsfield, Gloucestershire, with arrangement of passage and burial chambers similar to Keriaval.



(a) Neolithic bowl, Hedsor, Bucks.



(b) Food vessel (height $5\frac{1}{2}$ inches).
Gilling, Yorkshire.

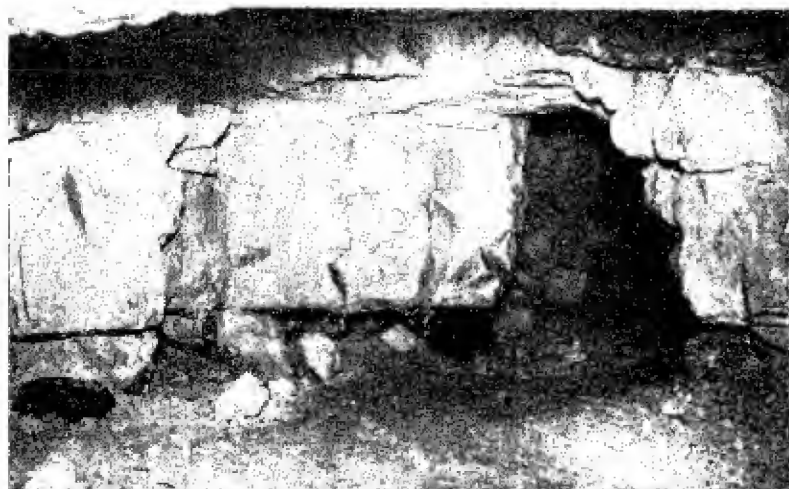


(c) Beaker (height $7\frac{3}{4}$ inches). Leslie,
Aberdeen.

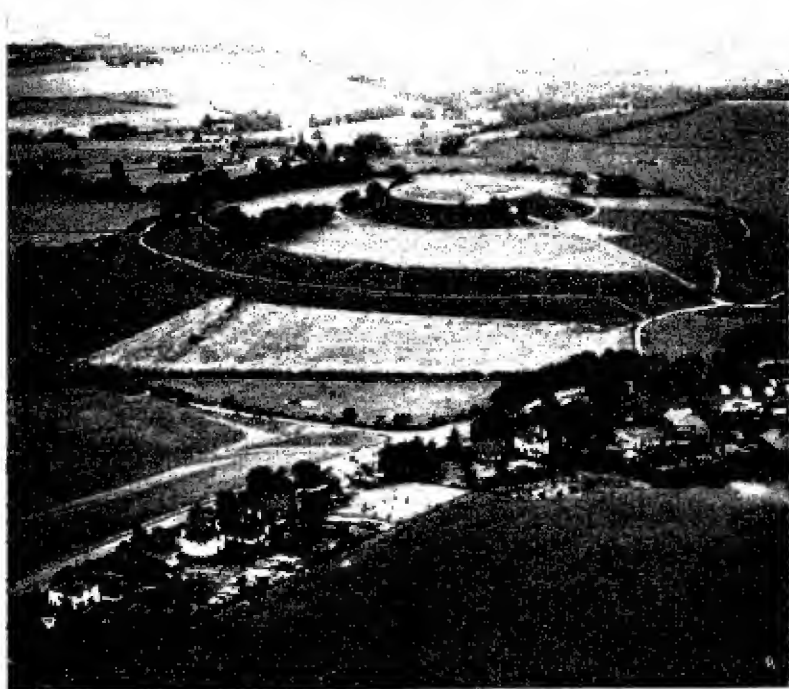


(d) Collared urn (height $14\frac{3}{4}$ inches).
Ford, Northumberland.

4. Prehistoric Pottery.



5. (a) Grimes Graves, Norfolk. Galleries of the Neolithic flint mines, showing a black flint seam.



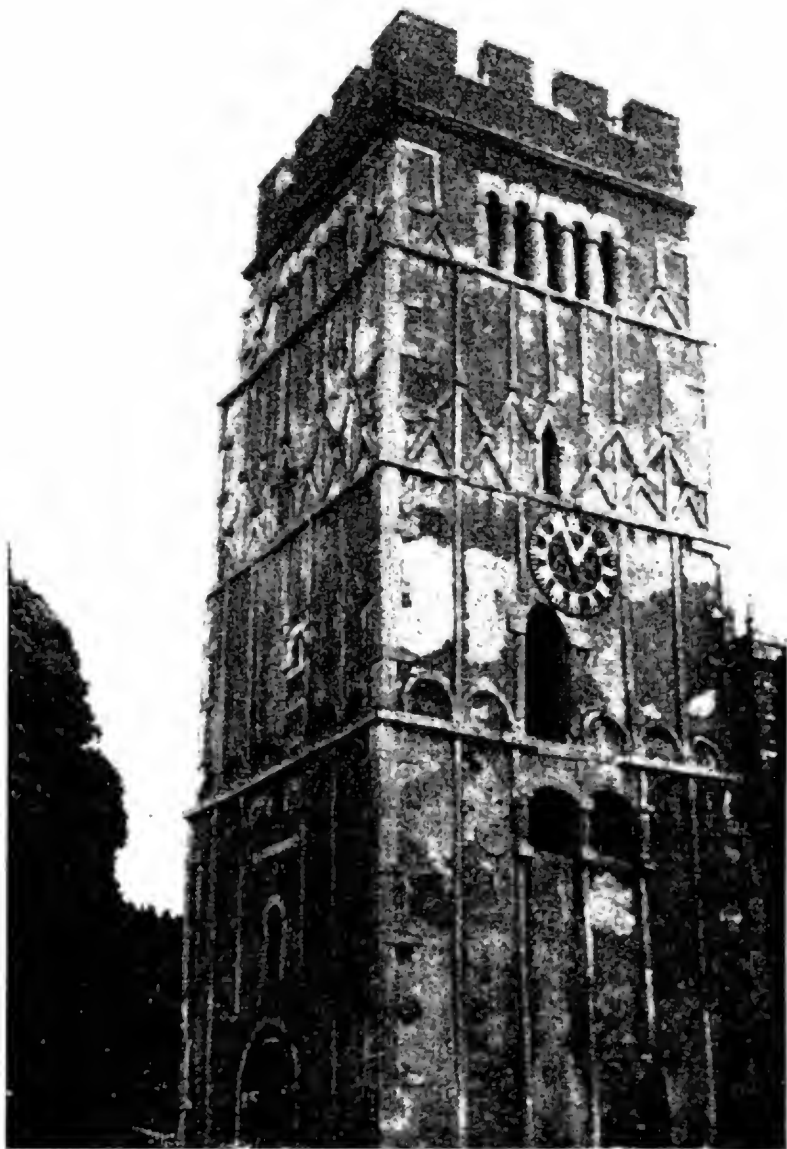
5. (b) Old Sarum, Wiltshire. An Iron Age hill fort also used in Medieval times.



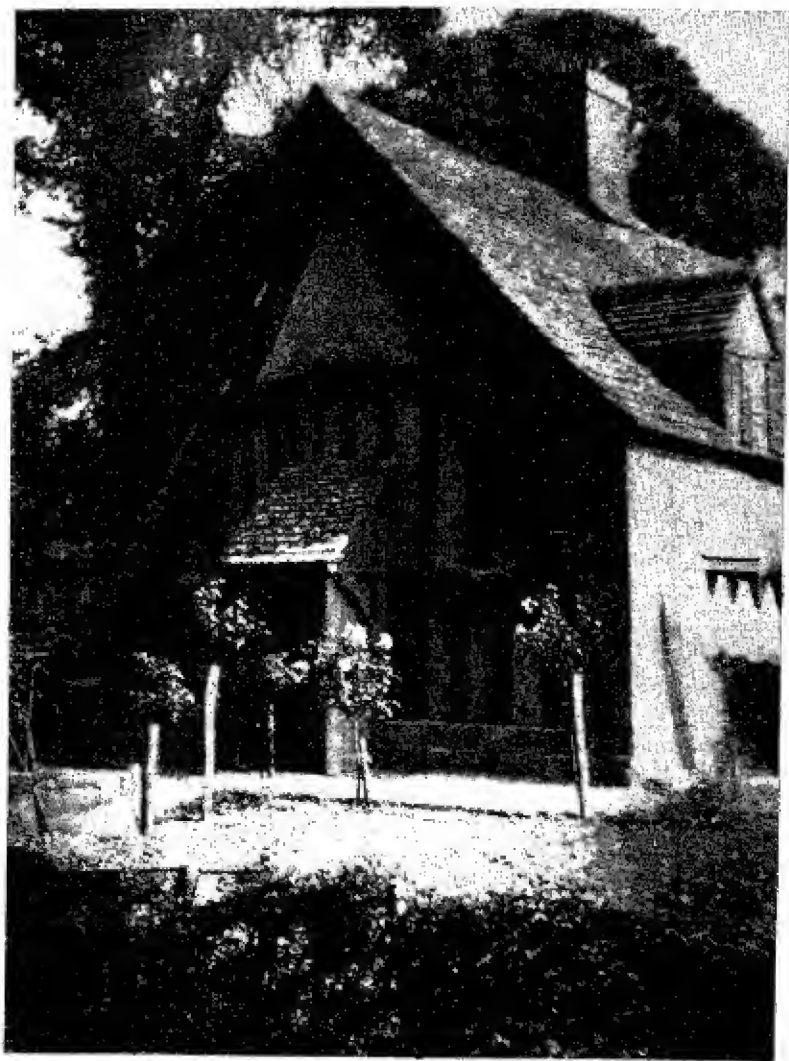
6. (a) Hadrian's Wall, Housesteads Fort, showing granary footings and the Whin Sill.



6. (b) Roman Town Wall, St. Albans, Hertfordshire. The tiles were removed by the Norman builders of the nearby abbey.



7. Earls Barton, Northamptonshire. A late Saxon church tower.



8. House at Didbrook, Gloucestershire, showing the original timber cruck construction with later work.

is worth remembering: "Long head, long barrow; round head, round barrow."

The new copper-bearing incomers buried their dead singly, the body being accompanied by such relics as a copper dagger or knife, flint arrowheads, an archer's wrist guard, a stone battle axe, and a cup in the form of a beaker (Fig. 22). Often in pagan burials a cup of some drink was included in the grave goods to refresh the deceased on his journey to the new life. Since we find that barley remains are much more common on beaker sites than wheat, and that some mug shaped beakers from East Anglia have handles like those on tankards we may be right in thinking that beer was the drink contained in their elegant beakers.

The beaker folk are the first of a succession of warrior aristocracy groups that came to our shores. They appear to have dominated the Neolithic inhabitants and to have looked skyward for religious inspiration rather than to the earth. Gold was obtained in the early metal age and discs of this metal with radiating ridges embossed on them are found in beaker graves. This is thought to be indicative of sun worship. From the period of the fusion of the late Neolithic and beaker folk come monuments which have a connection with the sun or stars. These "henges" have many variations but all consist essentially of a circular bank and ditch approached by a processional way leading from a river. They are often also aligned in some way to the position of the sun or stars at some particular date.

Inside the circular enclosure cremated burials in pits and a ring or rings of standing oak posts are often found. In the west and north of Britain the post rings are replaced by a stone circle, often known locally as the "Druids' Circle" (Fig. 23). The Druids how-

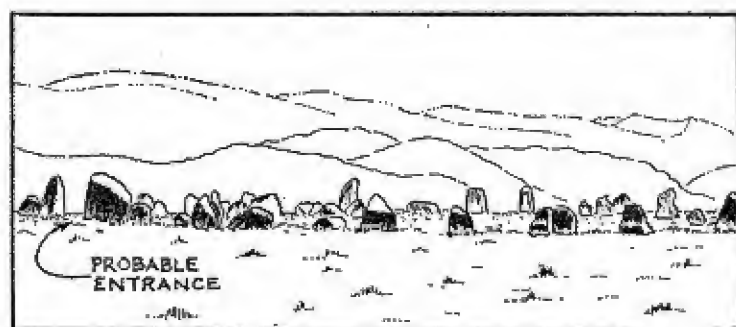


FIG. 23. The Druid's Circle, Keswick

ever were the Iron Age priests and had nothing whatsoever to do with their building.

THE WESSEX CULTURE

Once the value of metals was realised trade and prosperity increased and about 1,600 B.C., there developed in Britain a very rich society of rulers who appear to have acted as a "middle men" in a commercial enterprise. They passed gold from the Wicklow Hills in Ireland to the consuming areas of central Europe and the eastern Mediterranean where the great Mycenaean civilization was flourishing at that time.

This period of the Early Bronze Age has produced some of the most richly furnished barrows in Britain which are mainly distributed in the Salisbury Plain area, although outlying examples occur as far away as Cornwall, Norfolk, and North Wales. The finds from these barrows are sufficiently distinctive for them to constitute a special group which we call the Wessex culture. Gold chest plates, gold buttons and jewellery, cups made of the soft rock shale and daggers with slightly curved edges are typical. From these barrows have come some unique and magnificent objects.

A barrow at Mold in Flintshire contained a highly decorated gold sheet, probably worn by a chieftain as a cape. From Rillaton in Cornwall has come a gold cup in the shape of a beaker like those of the beaker folk. This was made in a similar way to one from Germany and others from Greece. At Hove in Sussex there used to stand an imposing barrow nearly 200 feet across. When it was excavated in 1821 an oak coffin was found. Inside was a body accompanied by a Wessex-type dagger and whetstone, a stone battle-axe and a perfectly made cup carved, or possibly turned out of a block of amber. Although amber is washed up on our eastern shores the fragments are quite small. The amber for the Hove cup must have been traded here from the shores of the Baltic where such large blocks occur naturally.

The most impressive of all our known Wessex barrows is that from the "Bush Barrow", one of a cemetery group at Normanton, near Stonehenge, on Salisbury Plain (Fig. 24). Bush Barrow was excavated in 1808 when the technique of barrow digging was still in its infancy. Consequently, although we have the finds from the excavation, there is only a vague account describing the position in which they were found.

The barrow contained what must have been a great chieftain judging from the objects buried with him. On his chest lay a decorated gold plaque. It had small holes at the corners and was

presumably sewn to his clothing. Near his head were the decomposed remains of a shield and by his shoulder was a bronze axe. At his side were two daggers and another lay under his hand. There was also a gold belt or scabbard hook and a miniature gold chest plate. By his leg was a stone mace-head and there were also some bone ornaments for a wooden shaft. These mounts may or may not belong to the shaft of the mace. They may belong to a separate wooden baton.

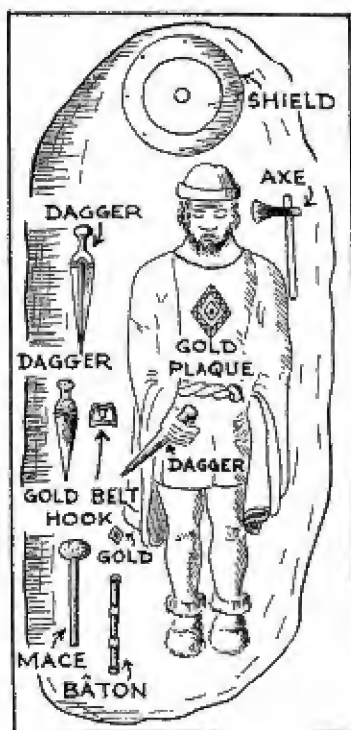


FIG. 24. Possible Form of Bush Barrow Burial

We do not know what dress was worn by the Wessex chiefs. The Bush Barrow man in the figure has been drawn wearing the kind of clothes that have been found in Bronze Age oak coffins in Denmark.

It is no accident that Stonehenge and the great bulk of Wessex barrows are close to each other and on Salisbury Plain. If you look

at a map of England you will see that hills radiate in all directions from Salisbury Plain. In prehistoric times these hills were the natural routeways that would be used for communication as the valleys at the time were choked with forest. East Anglia is linked with Salisbury Plain by the Chilterns and the Berkshire Downs; the Midlands are linked with the Plain by the Cotswolds; leading to the West Country are the Dorset Heights and the Mendips; and in the opposite direction are the North and South Downs giving access to Sussex and Kent.

Although today Salisbury Plain is a vast open area, little used except as army artillery ranges, in prehistoric times it must have been the meeting place for the various tribes living all over Southern Britain.

Trade would have been one of the major activities and it is not surprising that great monuments were built that would be recognisable from a distance. Stonehenge, the Avebury circle and the great fifty foot high barrow, Silbury Hill, would have been outstanding landmarks.

These landmarks were no doubt great centres of tribal meetings where animals, raw materials and precious objects were bartered. Dotted over the great plain are the barrow cemeteries which, by their number, suggest that the whole area was venerated. Perhaps chieftains were brought here to be buried, their bodies being carried on the backs of oxen along the routeways which converged on the sacred area.

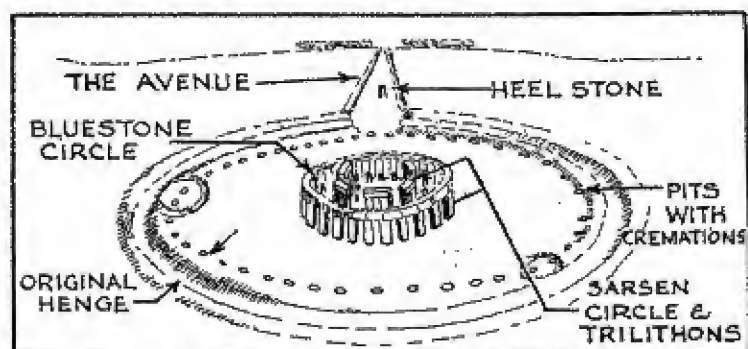
STONEHENGE AND AVEBURY

The world famous site of Stonehenge started its existence as a late Neolithic henge. This consisted of a circular bank and ditch encircling a ring of pits some of which contained cremations. Sites like this without the later additions of Stonehenge, exist scattered over the country. At Stonehenge, within the ring of pits, stand today two different groups of stones, the so called bluestones and sarsens (Fig. 25, top).

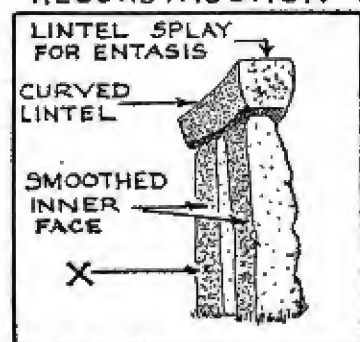
The bluestones are the smaller of the two and form a typical stone circle. These stones are of particular interest as they come from the Presely Mountains in South Wales. The stone has some very pronounced characteristics and could not, so the geologists tell us, come from anywhere else. The only way that these stones could have been brought to Stonehenge is on rafts along the Bristol Channel and up the River Avon. They may previously have stood as a specially sacred circle with lintels as some of them have mortise and tenon joints worked on them. The bluestone circle

was associated with beaker pottery, and this fact tallies with the finding of battle-axes of the same bluestone in barrows over beaker burials.

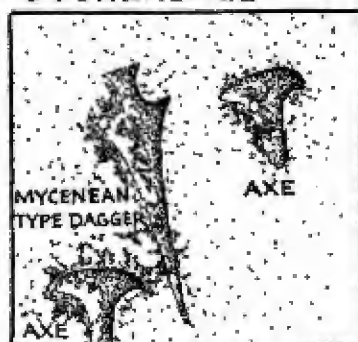
Roughly contemporary with the bluestone circle is the huge



RECONSTRUCTION OF STONEHENGE



ONE TRILITHON



CARVINGS AT 'X'

FIG. 25. Stonehenge

henge monument at Avebury, a few miles north of Stonehenge. Here was a massive bank and ditch which can still be seen today surrounding the village of Avebury. Within the perimeter of the ditch is a circle of formidable blocks of sarsen, a very hard sandstone, which lies in large boulders on the chalk in the vicinity, especially on the Marlborough Downs. Within this large stone circle originally were smaller circles of stones. Leading away from the southern entrance is an avenue of standing stones that links Avebury with another structure which formerly had concentric circles

of standing stones or timber posts. This involved system of post-holes at Overton Hill may represent another sacred site or possibly a large round house. Although not so famous as Stonehenge the Avebury henge is much larger in plan and in its day must have been just as important, if not more so, than Stonehenge.

Many guesses have been made as to the reason why these monuments were aligned to the sun or stars. The most acceptable theory is that they were used as calendars by these farming people.

Stonehenge has remains of further building periods in Wessex culture times the site must have had special significance as the massive internal structures were built at this time. The control and organising ability of the Wessex chiefs now lying in the surrounding barrows is shown by the huge blocks of stone which had to be dragged from the Marlborough downs, some ten miles away.

The great sarsen circle built outside the bluestones consisted of a ring of upright posts on top of which lay a continuous ring of lintels. The upright blocks were smoothed on their inner faces by means of stone mauls or hammers. Even today the fluted marks made by this process can be seen on the stones when the sunlight strikes their faces at an acute angle. The outer side of the uprights was left untouched. This suggests that in prehistoric times Stonehenge was meant to be viewed from the inside. Large tenon pegs were worked on the upper ends of the uprights which fitted matching mortise holes on the under sides of the lintels. The lintels were joined together by means of rudimentary tongue and groove joints. We can see at Stonehenge how a mistake was made in the measuring. One of the uprights was made too long and so the under side of the lintel was rebated to accommodate the extra length.

Within the bluestone circle were five "trilithons" which each consisted of two upright stones with a lintel stone across the top. The technique of jointing them is the same as in the sarsen circle but the trilithons stand free, not making a continuous arcade. One of the trilithon lintels has not suffered weathering and retains what is probably its original shape (fig. 25, bottom left). It is curved to follow the horseshoe shape of the other trilithons and the top is slightly wider than the bottom. This "entasis" or swelling makes the stone appear straight when viewed from below instead of appearing smaller at the top because of perspective. This architectural device was well known to the Greeks of the 5th century B.C., and used on the columns of their temples. In modern times it has been used to make the Cenotaph in London appear straight-sided. It seems improbable that such an advanced idea was invented

by early Bronze Age folk, about 1,300 B.C. For this reason archaeologists have tried to look away from Britain for parallels for this remarkable monument.

A theory that the Wessex culture chiefs responsible for its construction had contact with the Mediterranean world was based on a study of the grave goods from the surrounding round barrows and this was given a new significance when a carving of a dagger was found on one of the stones. It was of a Mycenaean type (Fig. 25, bottom right).

FOOD VESSELS

Roughly contemporary with the Wessex culture is another group named the "food-vessel culture", after the flower-pot shaped vessels that were included in the graves. These people were occasionally richly adorned and seem to have been very fond of necklaces of jet. In Ireland and Scotland the same style of necklace or possible chest ornament was made in sheet gold obtained from deposits in the local hills. The decoration on the gold "lunulae" looks as though it is copied from the arrangement of beads in the jet necklaces. In common with the other Early Bronze Age folk they were buried under round barrows, often in stone boxes called "cists." On the undersides of some of the capstones of these cists are strange markings called "cup and ring marks." The fact that the dead were placed in these decorated, cave-like chambers harks back to Megalithic builders of the Neolithic period, and the decoration is especially similar to that on the Megalithic tombs of Ireland and Anglesey.

From this group of people also come three curiously carved drums made of chalk that were found under a barrow at Folkton in Yorkshire. The stylised faces carved on them are the symbols of a primitive type of religion which was widespread throughout Europe at this time. Noticable features of these faces are the staring eyes of the "eye goddess." She seems to have watched over the dead, and the face is often found staring out through the entrance to the tomb.

One of the most remarkable finds from this period is the burial of a chief at Loose Howe in Yorkshire. Here, under a barrow, was a fully dressed man lying in a canoe-shaped coffin. He was resting on a layer of rushes, reeds and straw. The lid of the coffin was also boat-shaped and alongside was another dug-out canoe.

The relationships between the various groups of people living in Britain at this time, about 1,300 B.C., are very obscure. The Beaker folk, the Wessex folk, the Food-vessel folk and the Overhanging-

rim urn folk all overlap with each other culturally, and there are almost as many borderline cases as classic examples.

Gradually cremation became more fashionable than inhumation as a burial rite. The cremated bones were interred in vessels which, though they show a common pattern throughout Britain, have distinct regional forms of decoration.

THE URN FOLK

At this time, the Middle Bronze Age or the urn folk period, about 1,200 B.C., people settled on the really rugged moorland of Britain, and in these upland areas the relics of hut footings and little fields can often be found. Dartmoor is especially rich in these. Many hundreds of hut circles have been found there and also large pounds which were doubtless used for keeping cattle.

There was a characteristic form of burial. The cremated remains were placed in an urn. These urns are very similar to each other and all have an overhanging rim which may have been for the attachment of cords so that the urn could be lowered to its resting place. The snag in this theory is that some urns are upside down. Such are the problems of archaeology. Some of these urns are in their own barrows, but more often than not they are placed in already occupied barrows of an earlier period.

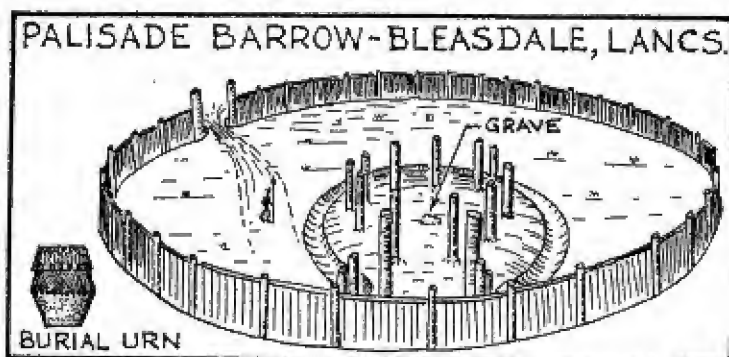


FIG. 26. An Urn Burial, Bleasdale, Lancashire

From the north of England comes one very grand urn burial. This is at Bleasdale in Lancashire (Fig. 26) where most elaborate structures were erected around a barrow which contained two collared urns with cremated bones, and smaller vessels of a type

found with the slightly earlier Wessex culture. Round the barrow a deep ditch had been dug and lined with birch poles. A causeway had been left across the ditch at one side. Around the barrow, inside the ditch, a ring of massive oak trunks had been set up, and on either side of the causeway three posts were erected. Surrounding this henge-like setting was another circular ditch in which a palisade was set.

Simple post settings are known from various Early Bronze Age barrows in Britain, but the nearest parallels on such a grand scale are in Holland, and are of the beaker period. Like the Wessex barrows the Bleasdale barrow was the burial place of a chieftain.

THE MIDDLE BRONZE AGE

Whilst the Middle Bronze Age folk were moving into our uplands in the north-west a new group of farming people arrived in the south-east. These people, whose settlement sites are found on the South Downs, used a true plough. We can tell this by the regular shape of their fields and the greater height of the lynchets formed in comparison with fields worked by earlier folk who used only a digging stick or hoe. From a site at Gwithian in Cornwall the actual ridge and furrow produced by a simple plough or "*ard*" has been found. The ploughing pattern found was criss-crossed. By ploughing a field twice at right angles the soil was more completely broken up.

On the sites on the South Downs the footings of huts that were enclosed by a palisaded bank have been found. At Itford Hill near Lewes, one of the huts was larger than the others which suggests that it belonged to the headman. Fortunately for modern archaeologists some wheat and barley had become charred during drying and were thrown away into a pit. This conversion of the grains to charcoal had preserved them unchanged in shape to modern times.

To the west of this area, on Cannock Chase and Salisbury Plain, cattle ranching rather than agriculture was practised and there are still to be seen running across the country many miles of banks and ditches that delineate the ancient ranch boundaries.

THE LATE BRONZE AGE

Throughout the Bronze Age metal had come more and more into daily use. At first bronze was only used for personal weapons, but gradually everyday things were made in that metal. From the Late Bronze Age, about 800 B.C., hoards of bronze objects are found.

Some of them contain a high percentage of broken objects, and it appears that they are the hidden stocks of scrap bronze belonging to wandering smiths or craftsmen who would prefer to melt down old scrap rather than purchase or produce new metal (Fig. 27).

In the Late Bronze Age swords of a heavy type meant for use on horseback are typical. Horse trappings are also found from

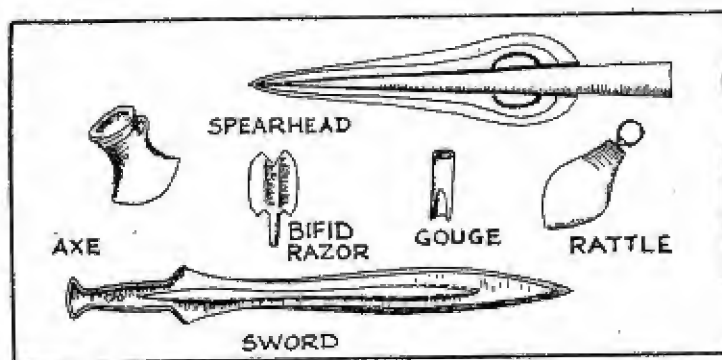


FIG. 27 Part of a Bronze Age Hoard, Co. Offaly

which we infer that groups of warrior horsemen were already arriving, heralding the great influx of the warlike Celtic tribes of the Iron Age.

LOOKING FOR NEOLITHIC AND BRONZE AGE SITES

Remains of Neolithic and Bronze Age man are very widespread, especially on the chalk-lands, for example, Wessex, the Downs, and the Lincolnshire and Yorkshire Wolds. Because the majority of the huts of these people had such shallow footings very few traces remain. Of those that are left for us to see the most famous are at Skara and Jarlshof Brae, in Orkney, at Plumpton Plain and Itford Hill on the South Downs, and on Dartmoor where there are remains of huts and enclosures.

Nearly all the barrows or "tumuli" up and down the country belong to the Neolithic and Bronze Ages. Round barrows are the most common type and often occur in groups or cemeteries. Archaeologists divide round barrows into classes according to their shapes, but this does not mean that these classes are necessarily

of different cultures and periods. The "disc" and "bell" barrows however are characteristic of the Wessex culture. The most common type is the "bowl" barrow whilst the "pond" and "saucer" barrows are the most rare.

Very good groups of round barrows can be seen at Winterbourne Stoke near Stonehenge, and at Priddy in Somerset, but so many are scattered all over the chalk country that it is not often that you are far away from at least one or two.

The best preserved examples of Megalithic barrows are those of Stoney Littleton in Somerset, Belas Knap and Hetty Pegler's Tump in Gloucestershire, and the West Kennet barrow near Avebury in Wiltshire. In Anglesey one of the chambered round barrows, Bryn Celli Ddu, is especially worth seeing, and in Orkney is the most beautifully constructed of all, Maes Howe.

The unchambered ones are rather disappointing as so little remains to be seen except a low hump in a field.

EXCAVATION

The monuments of the Neolithic and Bronze Ages most frequently excavated are undoubtedly the round barrows, though occasionally living sites and chambered and unchambered long barrows are dug. The director of the excavation of any barrow will probably wish to know the original shape of the barrow, how it was built and who was buried in it.

When digging it is very important to notice the slight changes in the colour and texture of the soil as these may show different stages of building or the presence of pits or stake holes.

The actual objects found, as well as the form of the barrow, will tell us the culture of the builders and subsequent users, and also a history of the use of the barrow.

Pottery varies but is often similar to a flower pot with white grit incorporated in it, although it may be any shade of brown, grey, or black. Pottery may or may not need to be "measured in" but any rims or decorated sherds should be carefully noted.

Flint tools and waste flakes will probably occur. These tend to be rather small, scrapers, knives, arrowheads, etc. Polished axe heads may also be found.

Obviously any gold, bronze, amber, faience, or indeed any unusual objects at all are to be treated with the greatest reverence as it is on these relics that much of the interpretation of the site depends.

Digging barrows means much back breaking humping of sterile material and often working down deep holes, but the excitement

once a burial has been discovered more than compensates for this.

BOOKS TO READ

- The Neolithic Revolution* (Cole), British Museum of Natural History.
Prehistoric Communities of the British Isles (Childe), Chambers.
Prehistoric Britain (J. and C. Hawkes), Penguin.
Prehistoric England (Clark), Batsford.
Wessex (Stone), Thames and Hudson.
East Anglia (Clarke), Thames and Hudson.
Stonehenge (Atkinson), Penguin.
The Prehistoric Chamber Tombs of England and Wales (Daniel), Cambridge.
Megalithic Builders of Western Europe (Daniel), Hutchinson.
The Bronze Age Round Barrow in Britain (Ashbee), Phoenix House.
English Prehistoric Pottery, H.M. Stationery Office.

CHAPTER VII

THE IRON AGE

IRON working began in the Middle East. The earliest iron objects were made in the period between 2,000 and 3,000 B.C. from meteoric iron which because of its rarity was only used for things that were sacred.

The earliest regular extraction of the metal from its ores was done by the Hittites living in Anatolia in the second millenium B.C. This area is rich in metal ores of all types and it is easy to see how, by curiosity or accident, the process was discovered. The secret of iron production was well guarded and it was not until about 1,200 B.C., when the Hittite empire collapsed, that the process became widely known.

HALLSTATT WARRIORS

Gradually iron-using warriors spread into Europe, and by 600 B.C., had established themselves in the Alps. This early Iron Age culture is called the "Hallstatt culture" after the type site in Austria. The chieftains were buried lying on their waggons accompanied by iron swords, spears, pottery and joints of meat. At Hallstatt were also found the salt mines of these people. Due to the fact that iron-ores are very widespread and plentiful the Hallstatt culture spread throughout Europe at an increased pace and the first people of this group arrived in Britain about 550 B.C. In Britain these early Iron Age folk are referred to as the "A" folk, to distinguish them from two later waves of Celtic invaders, the "B" and "C" folk.

LA TÈNE CHIEFS

At about the same time that the "A" folk were colonising Britain another group on the Continent were conducting a considerable amount of trade with the Mediterranean people among whom were notably the Etruscans. In exchange for raw materials the Celtic

warriors were receiving fine pottery and great quantities of wine, some of which was carried in beautifully decorated flagons.

The naturalistic decoration on these Mediterranean objects served as a starting point from which the Celtic craftsmen evolved their own equally beautiful curvilinear ornamentation which they lavished on much of their metalwork.

The type site for this phase of the Celtic Iron Age is La Tène at the eastern end of Lake Neuchatel where many beautiful weapons had been thrown into the lake as offerings. La Tène chiefs were buried lying on their chariots. With them were grave goods similar to those associated with the Hallstatt warriors. Like the Hallstatt chiefs some of the La Tène invaders came to Britain bringing with them their beautiful metalwork. They seem to have come directly from the middle Rhine and Marne valleys about 350 B.C., and settled in greatest numbers in the north-east part of Britain where the Hallstatt influence was weakest. On the Yorkshire Wolds many chariot burials have been found. Their culture is called Iron Age "B".

THE BELGAE

The third wave of Celts who came to Britain were the Belgae—Iron Age "C"—who arrived about 100 B.C. They came from the area between the Seine and the Rhine. They were the most highly organised of the Iron Age groups and were later one of the main enemies of Roman expansion.

Although the new techniques of iron working enabled the Celtic tribes to have superior weapons their basic economy remained much the same as that of their Bronze Age predecessors. Herds of cattle, sheep, goats, and pigs were reared, and in favourable areas such as the South cereals were grown even though the climate was rather wetter than at present. In the highland zone the emphasis was on stock raising as it is today.

LITTLE WOODBURY

The classic living site of the "A" folk in Britain is a farmhouse excavated near Salisbury. This farm called Little Woodbury is absolutely typical of many farms of this period that have been seen from the air. It consists of a round stockyard which enclosed one, or maybe two farmhouses, storage pits, hay drying racks, granaries and scooped hollows, which were, presumably, threshing floors.

The Little Woodbury farmbuilding (Fig. 28) was large, being some forty feet across. The roof was supported by two concentric

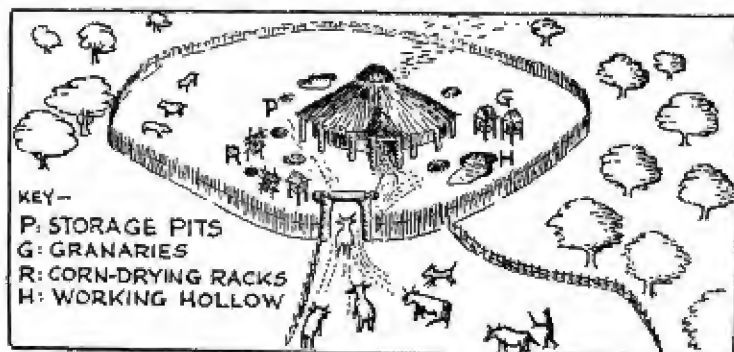


FIG. 28. The Iron Age Farm at Little Woodbury, near Salisbury

rows of stout posts making a colonnaded walk. In the centre were four massive posts set in a square. There was also a drainage gully running out through the porch which would carry away any water from the floor of the house. The oval shape of the sockets of the outer ring of posts suggests that small sleeper-beams were laid beneath them to enable them to carry great weights.

Unfortunately when the site at Little Woodbury was excavated the original ground surface was found to have been stripped off by erosion and so the hearth, traces of wattle fencing and small finds that might have been most instructive were missing. The storage pits found at Little Woodbury are common to all Iron Age dwellings on good land. These pits were used to hold grain, and were sometimes lined with leather held in position by sticks or else with dry stone walling where this was available. There are many more storage pits than would have been used at any particular time. This is because when the pits had been used for some time they became rotten. A new pit would then be dug and the old one would be used as a rubbish dump until it was filled up.

The farmyard gate at Little Woodbury had two curious antenna-like ditches running out from it in a "V" shape. This feature is typical of farms of this period and may represent two palisades tapering like a funnel to the gate to assist in getting the animals inside the farm. The settings of posts in the yard have been interpreted as granaries and drying racks which would be built on stilts to keep out the damp and vermin.

ALL CANNINGS CROSS

Some little distance away at All Cannings Cross is an Iron Age

village which has yielded a wealth of small objects typical of the possessions of the "A" folk. Large storage jars were used. Most of these were made of a coarse clay but a few were made with a fine red burnished surface of haematite. Among the small bone objects found were many combs. These are particularly interesting as they are typical of the Iron Age. These decorated combs appear to have been hung from a string round the waist (Fig. 29).

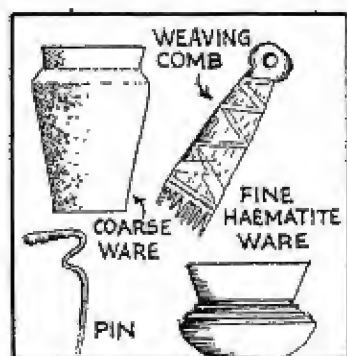


FIG. 29. Finds from All Cannings Cross

The Iron Age was a period of great unrest when the Celtic tribes of Europe were spreading outwards looking for new land on which to settle. It is to this period that the hill-fort belongs.

The Iron Age hill-fort is essentially the logical development of the Bronze Age enclosure used to pen cattle. In the "A" period rectangular enclosures were constructed on the South Downs whose purpose could either be for cattle pounding or for defence. In all probability these slight earthworks were only temporary refuges. We can understand this if we remember that the "A" folk were warrior-farmers who came to Britain, staked pieces of land and worked them from comparatively large farm-houses. A defensive enclosure would be built round each farmyard or on some vantage point a little way off.

CONTOUR FORTS

By about 250 B.C., the influx of La Tène tribes had become a real menace to those already in Britain, and in response to the continual danger of attack elaborate hill forts were constructed which were to become more and more complex through the rest of the Iron Age.

These larger forts are called "contour forts" as the defensive banks and ditches are laid out so that a hill top is encircled by earthworks built at the same height on the hill. The forts were always sited in such a way that good views of the surrounding country were ensured and so that the strongholds could be easily defended. The supply of water and the possibility of an escape route were also borne in mind.

The first of the true hill forts in Britain built about 250 B.C., had a flat piece of ground called a berm between the bank and ditch to prevent the bank from slumping forward into the ditch (Fig. 30).

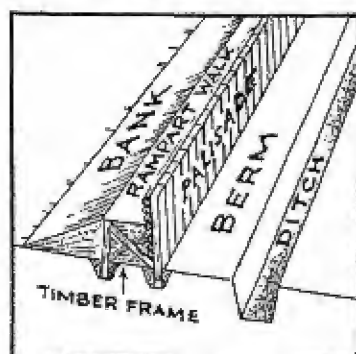


FIG. 30. Early Hill Fort Construction

To strengthen the outer face of the bank a wall made of vertical and horizontal posts was set up, and behind this the soil from the ditch was dumped. Some of the early hill forts such as that at Hollingbury near Brighton and at Bindon Hill, Lulworth, have a complicated system of timbers incorporated into the bank to give extra rigidity. The outer ditch in this period had a flat floor.

We know that these large earthworks were constructed by several gangs all working at the same time. At Ladle Hill in Hampshire a hill fort remains as it was left, half completed, in the Iron Age. The separate sections of the bank and ditch can be seen and also the heaps of earth lying just inside the proposed ring of the bank ready to be piled up to make the continuous earthwork. In one section the marking out trench which was first cut to mark the course of the defences can even be seen without excavation.

The entrances of a hill fort were, like those of later castles, the weakest points and consequently needed extra protection. For this purpose the banks on either side of the gate were often turned inwards at right angles and double pairs of heavy gates were placed

at the back and front of the "barbican" so formed. If any attacker was strong enough to break down the outer door he would be faced with another one. While he tried to batter down the second door he would be under heavy fire from the defenders on the high banks on both sides.

Towards the latter part of the Iron Age the defences of many hill forts were strengthened to a fantastic degree. At approximately the same time the sling was introduced to Britain as an offensive weapon. The slinger could hurl his missile much further than the distance over which a spear could be thrown. Therefore defence in depth was the only answer. Many of our most impressive hill forts were refortified in this way at the end of the first century B.C. Multiple banks and ditches were thrown up round them and at the vulnerable gates were a number of alternate banks and ditches. Any attacker would have to weave his way in and out of these and would be a very easy target for the defenders. It was only the mighty and ruthlessly methodical Roman army who ultimately sacked these strongholds.

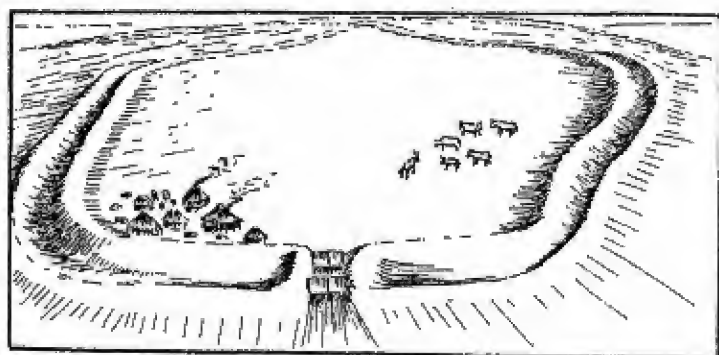


FIG. 31. Uffington Castle, Partial Reconstruction

Inside a hill fort (Fig. 31) there were usually small clusters of huts, each about twenty to thirty feet in diameter, made of wattling and thatch. It is fortunate for archaeologists that these perishable huts were usually provided with either a stone wall footing or a surrounding drainage ditch, or both. It is only by these ground features that the form of the structure can be determined.

Usually many pits are found surrounding the houses. Some beautiful dry stone lined pits in the Cotswold area suggest that they were originally for food. The careful excavation of some of

these pits has revealed thin vertical holes running round the circumference of the pit. They appear to mark the position of stakes which held back a leather lining intended to prevent fouling of grain. Some of the pits on the other hand show no lining features of any kind and judging from the dense black organic infilling were possibly used as rubbish pits or latrines from the moment of their digging.

VOTIVE OFFERINGS

Primitive people have a custom of throwing cherished belongings into lakes, rivers or bogs in order to propitiate the gods. This custom was brought to Britain by the La Tène warriors. From the Thames for example, has come a beautiful shield that was re-

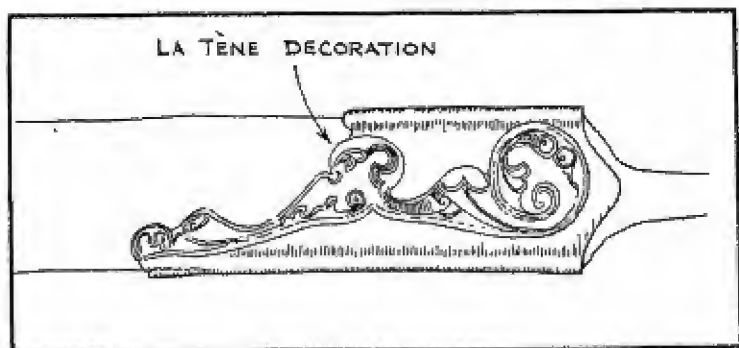


FIG. 32. Scabbard Mount, River Witham

covered at Battersea. It has on it raised curvilinear decoration which is further enhanced by red enamel work. The sword and scabbard mount (Fig. 32) were found in the River Witham together with a shield. The scabbard mount is one of the finest examples of the La Tène art found in Britain.

The greatest discovery of a mass of votive offerings of the Iron Age in Britain is the hoard from the peat bog site of Llyn Cerrig Bach in Anglesey. When the ground was being excavated in 1942 for the construction of Valley Aerodrome an iron chain was found which the workmen promptly used for dragging lorries. When other unfamiliar objects were discovered the attention of archaeologists was drawn to the site and the workmen were instructed to collect all the objects that they found in the peat. When all the

objects recovered were brought together they comprised a great mass of weapons, horse harness, iron sword blanks used as currency, shields, gang-chains, and a chariot. The chain used to drag the lorries was in fact a gang-chain made to chain together a group of prisoners or slaves!

DRUIDS

Perhaps the most exciting aspect of the finds at Llyn Cerrig Bach is their connection with the Druids. The Druids were the priests of a Late Iron Age cult described in Roman literature. They were particularly associated with sacred oak groves and pools into which votive offerings were cast. There is no evidence that the Druids were associated with stone circles as most of these were built in the Early Bronze Age and were more than a thousand years old when the Druids were living. In spite of this many stone circles have been assigned to the Druids in the past. Stonehenge is of course the classic example. Except for a small scattering of Iron Age pottery, this famous Wiltshire site of the Neolithic and Bronze Age has no archaeological connection with the Druids whatsoever.

The chariot from Llyn Cerrig Bach (Fig. 33) has been recon-

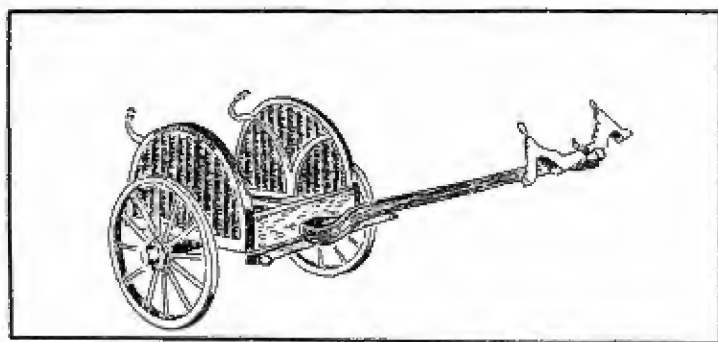


FIG. 33. Iron Age Chariot, Anglesey

structed from the shattered fragments. The actual appearance of the chariot is very different from that of the massive specimen seen in the statue of Boudicca at Westminster Bridge. The statue is the result of the sculptor's imagination rather than of archaeological fact, which was not of course available at the time.

The Llyn Cerrig Bach chariot was of very light construction, the two sides being merely hoops of ash filled in with wicker work.

The front was open so that a swordsman could run along the beam and, perched on the yoke above the two horses, swing his heavy sword at the enemy on either side of him whilst the chariot was driven at full tilt through the enemy lines. This very daring and skilful method of "hit and run" warfare was a speciality of the British Celtic tribes.

GLASTONBURY LAKE VILLAGE

In 1892 the diligent searching of an archaeologist brought to light a complete Iron Age Village on the Somerset marshes near Glastonbury. At nearby Meare the remains of another village were found and it appears that there must have been a whole system of settlements in the vicinity, dating from about 150 B.C., to the Claudian invasion of A.D. 43.

Complete prehistoric villages are rare and the Glastonbury village is all the more important as the swampy condition of the site has preserved the perishable objects, especially those of wood, so that a large number of everyday things, such as ladles, wheel parts, and a ladder, are preserved as well as a wealth of implements used in the country today, bill hooks, small sickles, a saw, and a file, etc. The huts ranged in size from eighteen feet to twenty-eight feet across and were built on clay platforms laid on brushwood. Due to the continual sinking of the huts into the peat below the clay floors had to be constantly raised forming many superimposed floors, each of which had a central hearth. Some of the huts had floorboards and possibly joists. By the hearth was a post to hold up the roof. Some of the huts may have had solid doors judging from an iron latch found at the site.

COURTYARD HOUSES

Also in the West Country, at Chysauster near Penzance, we have the remains of another Iron Age village. There are four pairs of circular houses ranged along the sides of a lane. Here we can still see the layout of the village, each dwelling having a cultivation plot attached to it as a kind of back garden.

The huts were of a particular shape common to the buildings in prehistoric villages in the west of Britain (Fig. 34, left). Within a roughly circular wall was a courtyard, entered through a narrow doorway. Opposite this entrance, across the courtyard, was the main living-room built in the thickness of the wall. To one side of the courtyard was a long narrow room, also within the wall thickness. This room may have housed livestock. In some of the

huts there were other rooms. On the floors were the remains of hearths and querns for grinding corn. As in the Neolithic village of Skara Brae the roofs may have been partially corbelled. At Chysauster the living-room of each hut had a hollow stone slab in the centre of the floor. This slab no doubt carried the weight of a central post that supported the roof of turf and bracken.

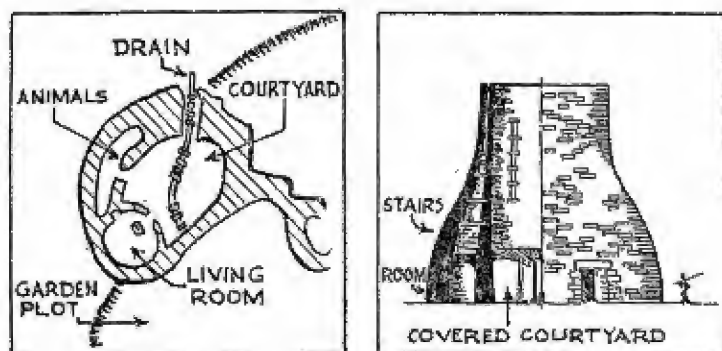


FIG. 34. A Courtyard House, Chysauster, Cornwall, and (right) a Scottish Broch based on Mousa, Orkney

The tradition of the courtyard-house appears to be of long duration. At Jarlshof in Shetland very similar houses have been found that date from the Bronze Age. At this same site there are also Iron Age houses of this shape. These were some forty feet in diameter. The rooms were divided from each other by partition walls which radiated from the central courtyard like spokes of a wheel. These dwellings are called "wheel-houses."

BROCHS

In Late Iron Age times in North and Western Scotland petty chiefs appear to have conducted continual campaigns of cattle raiding and plundering against each other. It is in this period that the courtyard and wheel-house plan was most fully developed. Each chief built for himself a large round house with the outer wall carried up to make a defensive tower. The central area was roofed over to produce the house. In the thickness of the outer wall was a spiral staircase giving access to the top of the tower. These towers are called "brochs," and there are many examples of them, in ruins, on the Western Coast of Scotland (Fig. 34, right).

The finest example standing is at Mousa in Shetland which still

stands forty feet high. The brochs were probably built by the Iron Age "B" folk as they fled northwards from the invading tribes of the Belgae, or "C" folk. The brochs continued to be used until after the collapse of the Roman Empire.

THE BELGAE

About the year 100 B.C., the strongest and most fully organised Iron Age tribes were beginning to cross the English channel. These people were the Belgae, or "C" people. They originated in North Eastern Gaul and were to give the Romans trouble from both sides of the channel. Every time the Romans tried to subdue them in Gaul the Belgae escaped to their kinsmen in England, returning later to harry the Romans once more.

Julius Caesar came to England in 55 and 54 B.C., so that he might defeat the strongest of the English Belgic kings, Cassivellaunus, on his own ground. Although Cassivellaunus was beaten the Romans' triumph was short lived. Soon after Caesar withdrew, the Belgae had things their own way again.

The Belgae were the first people to introduce coinage to Britain, and judging from the siting of their settlements in the clay lowlands they were also the first people to use a heavy plough. Equipped with this implement they were able to break up the rich land which had previously been choked with dense forest.

BELGIC ART

With the coming of the Belgae we see the greatest development of the La Tène style of art. This style of the Late Iron Age period, roughly contemporary with Caesar's invasions, is often copied to-day and is popularly known as the Celtic style. Examples of these imitations can be seen everywhere. Look carefully at finger plates, door knobs and stair carpet clips and you may find Celtic motifs are used.

The Belgae lavished their art on personal trinkets, weapons, and horse trappings. The wives of the rich used bronze hand-mirrors copied from Etruscan models which were beautifully decorated with swirling designs and engraved basket-work ornament. Red enamel was used to heighten the rich effect. The mirrors, brooches, jewellery, and personal possessions were buried with their owners under round barrows and so have been preserved in a perfect condition to this day. The two most famous of these mirrors come from Birdlip in Gloucestershire and Desborough in Northamptonshire. The men had shields decorated like the mirrors with embossed

work and enamel. We have already noted the one from Battersea which is now on view in the British Museum.

The Belgae were particularly fond of wearing metal neck ornaments called torcs which consisted of twisted strips of gold or bronze with looped terminals. We know this from descriptions of the Celts written by the Romans and from the numerous sculptures of a favourite Roman theme, the dying Gaul. The Gaul is shown naked except for his torc.

A torc, found at Snettisham in Norfolk is perhaps the most magnificent piece of Celtic art yet found in Britain. It was made of electrum, an alloy of gold and silver, and has a wealth of La Tène ornament on its terminals. It is possible that this torc, buried for safety in time of upheaval was worn by Queen Boudicca herself.

HILL FIGURES

The white horses and human figures cut into the sides of the chalk downs may have originated in the Iron Age, although the only proved example is the famous white horse of Uffington. This huge figure is cut into the turf just below the Iron Age hill fort

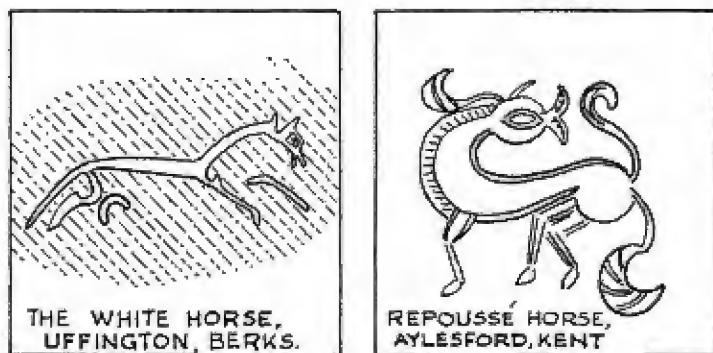


FIG. 35. A Hill Figure and a Decoration on a bucket from a Belgic Grave

of Uffington Castle on the Berkshire Downs (Fig. 35, left). It seems that the horse was not made by the builders of the hill fort, who were a "B" tribe, but by the later Belgic "C" folk. We can associate the horse with the Belgae because the design is very similar to that of other horses depicted on their coins and metal work. All these horses have their legs disconnected from their bodies and are drawn in the stylised "La Tène" fashion.

The shape of the head of the Uffington Horse is remarkably like that of some little horses which decorate the rim of a bucket found in a Belgic grave at Aylesford in Kent (Fig. 35, right). The horse seems to have been the crest of the tribe living in the Berkshire Downs area whose members appear to have carved their device on a prominent landmark in their territory. The men and women of the Iron Age seem to have venerated animal totems such as boars, horses, and ducks in the same way as the Red Indians. We see an echo of the same idea in the use of animals in heraldry and as mascots.

BELGIC EARTHWORKS

Although the Belgae built large earthworks to defend their strongholds these defences were somewhat different from those of the "A" and "B" folk. They were set in valleys and usually situated at strategic river crossings. England became divided into great tribal areas, some tribes having a capital where the royal household lived. At these centres courts would be held, and from them coins would be issued.

The defences consisted of massively built dykes running for miles across country, and were directed against the chariot which was the major fighting weapon. These dykes were not always continuous, and presumably where the land was naturally impassable, being dense forest or marsh, no defences were necessary.

At Camulodunum, the forerunner of modern Colchester, the main area of occupation is guarded to the West by several roughly parallel dykes. The area of settlement, within the great dyke system, was relatively small and the remains of light wooden houses have been found. Here, at the biggest of the Belgic towns, there were three successive building phases during which the settlement area moved from an early contour fort to the final site next to the River Coln (Fig. 36). Like the great hill forts these Belgic strongholds held not only people but the cattle and fields upon which the inhabitants were so dependent.

At Lexden, within the dykes of Camulodunum, is a large barrow which contained a cremation burial with a wealth of rich objects, including a funeral carriage, sculptured bronzes, gold and silver objects, Roman wine vessels, and much fine pottery. These grave goods show, in common with others of the late Belgic period, that even before the Romans came it was the fashion of the Celtic aristocracy to Romanise themselves as much as possible by importing or imitating Roman finery.

The Lexden barrow brings us to the end of the prehistoric period

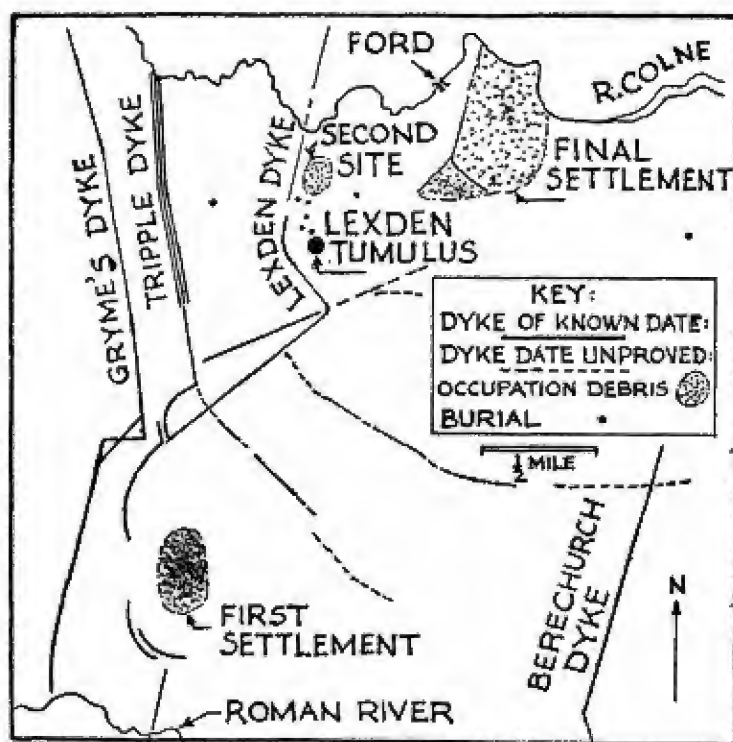


FIG. 36. The Belgic Settlement and Earthworks at Colchester

and may be the tomb of the great chief Cunobelinus, Shakespeare's Cymbeline, whose son, Caratacus or Caradog, resisted the Roman invasion until his defeat in A.D. 51.

BOOKS TO READ

The Celts (Powell), Thames and Hudson.

Prehistoric Britain (J. and C. Hawkes), Penguin.

Later Prehistoric Antiquities of the British Isles, British Museum.

The Lake Villages of Somerset (Bulleid), Glastonbury Antiquarian Society.

A Find of the Early Iron Age from Anglesey (Fox), National Museum of Wales.

Southern Britain in the Iron Age, Ordnance Survey Map.

CHAPTER VIII

ROMAN BRITAIN

THE fascination of the Roman period has started in many amateurs and professionals alike a lifelong interest in archaeology. Evidence of the invincible and terrible grandeur of the Roman Empire is spread over a vast territory from the Caspian Sea to the Atlantic, and from Egypt to Scotland. Even the most unimaginative person can hardly fail to be stirred by the sight of the great ruined towns of North Africa; the Colosseum at Rome, the scene of so much mass brutality; or Hadrian's wall stretching seventy-three miles across Britain from the Tyne to the Solway.

The amazing success that the Romans enjoyed in their conquest of foreign lands and the integration of these lands with the Empire was largely due to the wonderful organisation of the army. Everything from the method of fighting to the soldier's burial fund was systematic and worked out to the last detail.

In battle the Celts relied on individual acts of bravery. This method of fighting may be effective against foes organised (or disorganised) on a similar basis, but against Roman discipline the Celts were no match. The arms they carried were also inferior. The Celts used a long swinging sword and small round shield while each Roman had a large curved oblong shield, a spear, a short jabbing sword, and a dagger. In battle the Roman spears would be discharged first, sticking fast into the enemy's shields where they bent just below the head, rendering the shields useless.

Upon encountering the shieldless enemy the Roman soldier would deliver a series of relentless jabs with his short sword, over and under the shield, keeping close to the enemy so as not to allow him room to swing his long sword. Should the Celt succeed in doing this a well aimed jab under the arm would finish him off.

The Roman army consisted of two types of soldiers, legionaries and auxiliaries. Legionaries were Roman citizens whereas auxiliary soldiers were from friendly conquered countries who were given Roman citizenship upon completion of military service.

In a large battle both legionaries and auxiliaries would be present.

The auxiliaries were usually deployed at the side so that they could use their special native skills such as horsemanship, swimming, or slinging. The highly trained absolutely reliable legionaries were placed centrally. Often auxiliaries were stationed in front of them to take the first shock of the enemy attack, and battles were sometimes won without the legionaries having to fight at all.

THE ROMAN INVASION

Everyone knows that Julius Caesar came to Britain in 55 and 54 B.C. but the real conquest did not take place until A.D. 43 when the Emperor Claudius made the major invasion.

At Richborough on the Kent coast there are the remains of a huge supply depot built by the Romans when they invaded Britain. Lying beneath the ruins of a stone-built fort of the third century are the traces of massive wooden granaries and warehouses. Of an even earlier date than these are a pair of parallel ditches cutting across the knoll on which the fort stands. It is very probable that these were the first earthworks rapidly thrown up by the Roman general Aulus Plautius when he made a beachhead here in A.D. 43. After this landing the Romans struck across country. They headed for Colchester, the Belgic capital, and we know that they crossed the Thames by a bridge at some point on their journey. Many people have assumed that this was on the site of the present London Bridge. There are, however, other places on the Thames further downstream where a crossing could have been forced. The description we have of the crossing place fits the Swanscombe—Grays Thurrock area very well and the river could have been crossed by a pontoon bridge.

Colchester was then taken without much difficulty, the Emperor Claudius having arrived with his elephants. Claudius returned in triumph to Rome after only sixteen day's stay, and Aulus Plautius was given the task of conquering the rest of Britain. The armies struck rapidly across the country and reached the Mendips by A.D. 45. We know this because ingots of lead have been found at the Roman mines at Charterhouse, near Priddy, which were stamped with the date of their manufacture.

When the Romans were faced with tough opposition they often consolidated their lines by building a series of very strong frontier forts. These were connected to each other and to the large fortresses by roads so that troops could be moved rapidly to the front line at short notice. The Romans used the lie of the land to their advantage and so they often fortified a neck of land between two estuaries of large rivers.

About A.D. 50 the dividing line between opposing forces in Britain lay between the Humber and the Severn. Between these two estuaries the Romans built a trunk road, the Fosse Way, which followed the high ground of the Cotswold Hills and the Northamptonshire Uplands. On either side of the road there were many forts, the biggest of which were the fortresses at Gloucester and Lincoln. These made a defensive strip some thirty miles wide along the road. From this line of strength the Romans were able to



FIG. 37

strike out towards the tribes of Wales and the North (Fig. 37).

After twenty years of sporadic fighting and trouble behind the lines the armies were once again used to extend the field of Roman conquest under the direction of a most able governor, Agricola. In the next six years the Romans reached further north in Britain than they were ever to do again. Forts of this period can be traced along the Eastern Scottish coast as far as Aberdeenshire.

Due to the death of his only surviving son, and the Emperor's restriction on his funds Agricola had to return to Rome at the moment when he had the whole of Scotland in his grasp.

From this time onwards the Romans were on the defensive trying to hold what they had gained. Their position in Scotland was weak, and so they withdrew to defensive lines that had been built in the rear of Agricola's forces at necks of land between the Tyne and Solway and the Clyde and Forth. Roman Britain then remained reasonably stable until the late third century although in A.D. 197, the North was invaded by the Highland tribes.

About A.D. 287, pirates on the eastern shores of Britain had become such a menace that it was necessary to construct a system of shore forts, and the remains of these can still be seen. For another seventy years things were again relatively peaceful.

From A.D. 364, raids and invasions from the tribes to the east, north and west became more and more frequent and this, combined with the troubles that Rome herself was experiencing at that time, made the authorities withdraw the legions from Britain about A.D. 410. As we shall see Roman culture in Britain seems to have continued until the last decade of the fifth century.

FORTRESSES

The Roman legions' permanent headquarters were the fortresses built at strategic places. In contrast to the hill forts of the Iron Age these great centres of the defence system were situated on low ground guarding the lower courses of large rivers (Fig. 38). This was a bold method of planning and shows the confidence the Romans had in their own organisation. Just as the hill forts were inaccessible refuges so the Roman forts were the centres of aggressive defence.

These forts were always rectangular in plan and the corners were rounded to make them stronger. Outside the fort would be surrounded by several concentric ditches. At the four corners of the fort were look-out towers and along each side was a series of turrets containing staircases so that the garrison could rapidly reach the rampart walk.

To give extra strength to the fort's defences thorn hedges were sometimes planted in the ditches and if it was considered that a gateway needed strengthening camouflaged pits, each containing a sharpened wooden stake pointing upwards, were dug into the roadway. These pits were arranged diagonally rather like a modern mine-field. The Roman soldiers called these "lilies"!

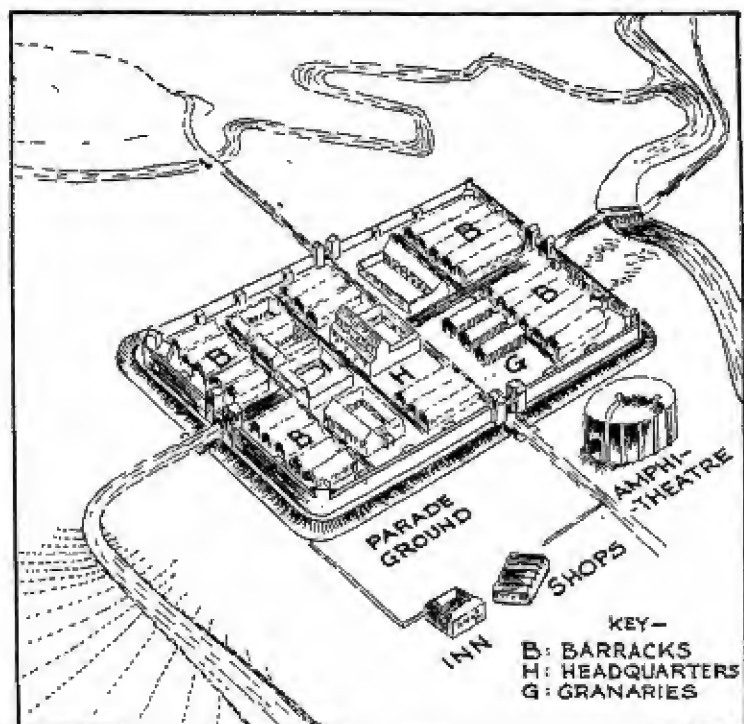


FIG. 38. A Roman Fortress, based on Caerleon

Within the walls of a fortress were roads, barracks, the commander's house, headquarters, hospital, granaries, workshops, and stables. These were laid out in a standard pattern. The smaller forts, and even marching camps, were laid out in exactly the same manner. This system had the advantage that a soldier from any part of the Empire would be familiar with the layout of any Roman fort and could find his way around as soon as he arrived.

Roman roads have a fascination of their own, not merely on

account of their construction, which was excellent, but also because they are splendid examples of cross country surveying. The roads always followed the most expedient routes whilst at the same time making the most of the topography of the land.

Some people think that Roman roads were absolutely straight. This is not strictly true, however. They were for the most part laid out in straight sections that ran between sighting points along the route. The remarkable straightness was carefully kept in order to be the shortest distance between points and prevent the soldiers from being ambushed whilst on the march. In overgrown country a wide verge of land was cleared on either side so that an enemy could not creep up to the road unseen.

Just like roads of today the Roman ones were cambered and it is the ancient raised central *agger* which often gives away their course. Quite a number of the roads built by the Romans are in use to this day, for example a good part of the A5 or Watling Street, to Holyhead from London. It is interesting to see that modern planners propose to have two motorways running from north to south one on either side of the Pennines. The Romans had the same idea in the first century A.D., and their two parallel roads are there to this day (Fig. 39).

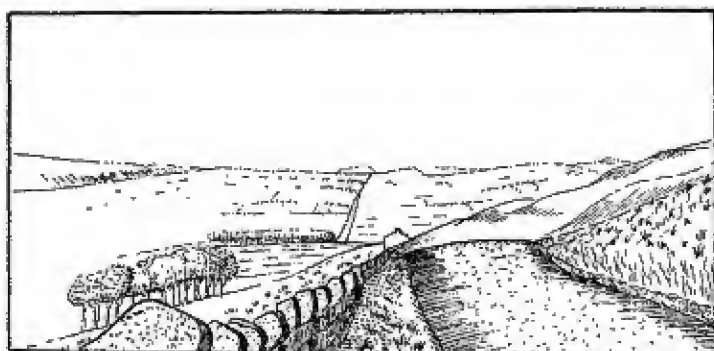


FIG. 39. The Roman Road, Jeffry Hill, Lancashire

It is instructive to explore the countryside on foot with a one inch or two and a half inch Ordnance Survey map in order to find the remains of those Roman roads that have shrunk to narrow lanes or are the boundaries of fields or woods. A country lane will often give away its Roman origin, its hedges being set well back

from the lane side, leaving a wide grass verge on both sides which may slope down slightly away from the lane retaining the original agger profile.

The two roads built to the north were to supply the forces as they pushed towards Scotland. Although Agricola never managed to conquer the Caledonians he left behind him a fortress at Inchtuthil near Perth from where have come so many Roman nails, and as we have seen two defensive lines of forts and roads cutting across the land between the Forth and Clyde, and the Tyne and Solway. The second of these was the basis of the later frontier wall, Hadrian's wall, built in that emperor's reign from A.D. 122 to 128, but much restored by Severus about A.D. 200. This wall was intended to delineate the boundary between the Roman Empire and the territory of the barbarians to the north.

HADRIAN'S WALL

Hadrian's Wall consists of a series of forts served by an east-west military road. Each pair of forts is joined by a wall which has, along its length, "mile castles" and staircase turrets. For some of its length the wall runs along the crest of a rocky ridge. Where it was built on relatively flat ground a ditch was cut in front. Behind the wall are parallel ditches collectively called the vallum which marked the limit of the military zone. The wall system was supplied from depots some way back and if the tribes to the north were to get out of hand reinforcements could be called up from the fortress at York.

Several times in the Roman period the northern tribes were able to scale the wall and attack far down into Britain. This was not because of any weakness in the wall system but was due to the fact that the garrison had been withdrawn several times to help one of the claimants to the position of Emperor fight his own private battle.

Hadrian's wall stands today as one of the finest monuments to the ability of the Romans, and particularly their army.

TOWNS

In the wake of the army as it pushed its way across Britain in the middle of the first century A.D. came civil administrators who were employed to resettle the population. It was official policy to get the newly conquered people to build for themselves typically Roman towns and villages under the guidance of Roman army engineers.

To speed the process as much as possible retiring Roman soldiers

were encouraged to take local wives and settle down, either in the new towns, or on the land as owners of estates.

Many of the new towns that were built were near to one of the big hill forts or Belgic strongholds. The population was ordered to abandon its former home and live a more urban existence in the valley below.

The supervision of the new building work by army engineers meant that many of the features of the towns were similar to those of a fortress. Although shapes of the towns were irregular (not the fort "playing card" pattern), the walls, gates, and outer earthworks were virtually the same as their military counterparts. Inside the town the streets were laid out in a grid pattern. At the centre were the town hall, market square, forum, and basilica, which were very similar in form to the headquarters in a fortress.

To amuse the population an amphitheatre was often built outside the town in which various shows, some of them remarkably cruel, would be regularly staged. At St. Albans, the one Roman town in Britain with the official title of city, a theatre was incorporated with the amphitheatre. The newly-Romanised barbarians did not take kindly to the highbrow idea of watching plays, and the theatre ended its days as a rubbish dump.

Some Roman towns in Britain were built in a very grand manner to impress the local folk with the grandeur of the Roman way of life. For example, the main gate at St. Albans leading to London was a massive affair, far larger than was necessary. This method of impressing the local people misfired once in the Roman occupation of Britain.

At Colchester the Emperor Claudius had an imposing town built next to the site of his victory over the Belgae in A.D. 43. In the town centre a magnificent temple was built to Claudius so that the townsfolk might worship him. After a period of great provocation by some administrators the Iceni, whose home was in East Anglia, rose in A.D. 61 under the leadership of the famous Boadicea or Boudicca. The Roman town of Colchester was their first objective and the temple to Claudius was razed to the ground. All that was left of the temple was the vaulted platform which was later used as a base by the Normans for their castle. The A.D. 61 revolt was the most dangerous uprising that the Romans had to deal with in Britain, and it might easily have succeeded. Both St. Albans and London suffered at the hands of the Iceni as well as Colchester and there are burnt layers in the Roman deposits of these three towns which give archaeologists very convenient dating levels.

In a Roman town in the provinces the poor would live huddled together in the working quarter. Usually they lived in houses and

shops of timber, and wattle and daub. The wealthy would have their homes away from the centre and this area would be very open, rather like a garden city. This type of town was a compromise between the tightly packed truly Roman town of the Mediterranean and the native stronghold which was mainly open space.

At Silchester, the most fully excavated Roman town in Britain, the whole area was very open, no part of it being closely set with houses. Some of the houses in our Roman towns were very big. At St. Albans one house virtually filled the whole block surrounded by four roads.

ROMAN VILLAS

On the Ordnance Survey maps of Southern Britain can be found many sites called "Roman Villa." This title, although fully understood by the archaeologist, is somewhat confusing to the uninitiated who probably conjure up a vision of a palatial building inhabited by Roman lords and ladies with little to do but laze about all day sunning themselves and consuming great quantities of wine.

The provincial villa, although luxurious compared with the Iron Age farmsteads of the Little Woodbury type, was a place of work. These villas were the estate houses owned either by retired Roman soldiers or the local head family who had become Romanised. The villa was ranged round a courtyard, the "big house" was along one side, and along the two adjacent sides were the farmworkers' quarters, workshops and barns (Fig. 40).

The area of the estates can be gauged by the size of the barns,

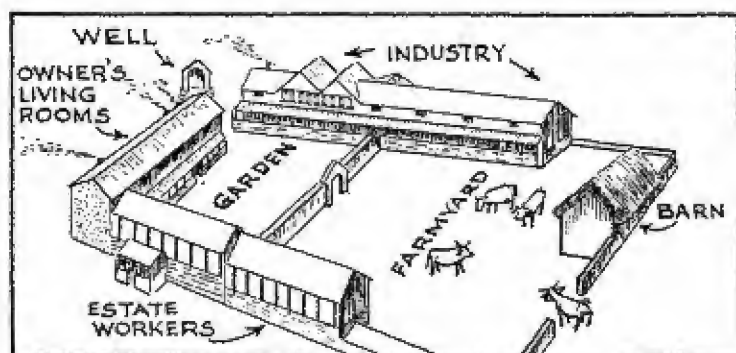


FIG. 40. A Large Roman Villa, based on Chedworth, Gloucestershire

some of which are of a great size. A famous villa at Ditchley in Oxfordshire had a barn which it is estimated could store the grain from 3,000 acres of land. A modern farm with an area of 1000 acres would be considered to be fairly large.

Some impression of the wealth represented by a Roman villa is shown by the way in which it was designed. In the centre of the house would be the reception and dining-rooms (Fig. 40), possessing floors that were usually decorated with mosaic. On either side were the owner's living-rooms. Doorways from these rooms opened onto a covered way that ran the length of the house.

The idea of bathing was brought here by the Romans, and every self respecting villa owner would have a bath suite at one end of the house. This consisted of a group of heated rooms which were designed to make the bather perspire. Oil was then rubbed on to the body and the mixture of oil and dirt was removed with a small scraper called a strigil. After this cleaning the bather would jump into a cold plunge-bath. The hot rooms were heated by a furnace built next to the hottest room and the heat of the fire was passed under the floors which were supported on pillars of tiles. After being led through several rooms the hot air would be allowed to pass up to the roof and away by means of pottery flues in the walls.

This "hypocaust" system of heating was very efficient and the heat stored in the walls and floor would keep the temperature of the room steady even if the heat of the fire fluctuated. Being set at ground-level, hypocaust systems and mosaic floors are the most usual parts of a villa to survive, and it is from them that much of our knowledge of the upper part of the house has to be deduced.

The presence of an upper storey is sometimes revealed by extra thick footings, very small rooms which would probably be for staircases, and tumbled wall-plaster showing painting from not just one room, but two. The provincial villa in Britain was probably of half-timbered construction on the upper storey. Fragments of fire-hardened daub with wattle and straw impressions have been found which point to this mode of construction. It is fortunate for archaeology that some villas ended their life through fire, as the baking of clay daub has preserved these tell tale impressions clearly.

An interesting feature about the distribution of Roman villas is that they are mainly situated in the southern part of Britain. This is because arable farming is only possible in land which is peaceful and not attacked by marauders. Villas then indicate peaceful conditions and good soil, and it is little wonder that some of the estates in Southern Britain were so large, as it was their produce which fed the soldiers guarding the Roman frontier in the inhospitable northern highland.

In the north of Britain pastoral farming was practised when conditions were peaceful. The northern farmsteads were very different from the rich villas of the south. They were essentially the old Iron Age round house type made of timber, wattle, and thatch with stone footings. They were set on a hillside, a level platform being excavated on which the farm was built (Fig. 41). The native folk must have seen many camps and forts of the army, and consequently the enclosing palisade round the farmsteads and the various pounds were made with much straighter sides than hitherto. No doubt these northern farmers were able to conduct a brisk trade with the army, as wool and leather would be constantly needed for clothes, tents, harness and footwear. Unfortunately very few remains have been found in these farmsteads and consequently exact dating is impossible. Recently much work has been done on this type of farmstead in the Cheviots and the Southern Uplands of Scotland, and gradually they are being tied into the known historical events of the period. In Southern Britain too work is being done to try and find minor settlements connected with Roman villas.

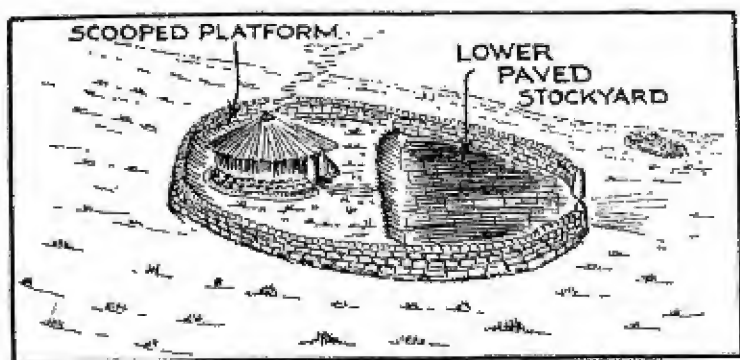


FIG. 41. Native Farmstead on Moorland

An estate of three thousand acres would require a considerable labour force. All the farm workers would not have lived in the main villa itself, some must have lived out. Aerial photography has recently shown that near many known sites of large villas there are farmworkers' villages which still retain the round houses and irregular garden plots and pounds typical of a native Iron Age culture.

RELIGION

The most important feature of the official Roman religion in the provinces was compulsory worship of the Emperor. The wealthy people in every town were obliged to officiate at a temple dedicated to the Emperor. For this privilege these men were required to pay large subscriptions towards the upkeep of the temple and the state.

The Roman authorities were quite willing to tolerate all kinds of gods of subject tribes so long as worship of the Emperor was not neglected. The Celtic people of Britain had many gods and goddesses some of which were only worshipped in a very small locality. Springs, rivers and hills were often identified with the local spirits.

We have been able to obtain a good idea of what a Celtic temple must have been like from the one found at Heath Row on the site of London Airport. It was made of wood, and consisted of a rectangular sanctuary eighteen feet by twelve feet, surrounded by a portico of wooden posts. At one of the short sides was a simple porch. This building is of great interest as many temples were built in Britain in Roman times which were evolved from the Celtic type. The Romano-British temple had a central stone and brick built sanctuary, called a *cella*, round which was a colonnaded veranda. The statue of the god inside the *cella* was lit by high windows. Temples of this type have been found throughout Roman Britain.

As well as public religion, people had their own household gods whose statues would be set in an honoured position in the home.

Of all the many Roman religions that existed Mithraism and Christianity stand out because they demanded the most of their supporters. Both had a moral code which had to be followed. Although their origins are different the ritual was superficially similar. The initiates to Mithraism were admitted to the religion only after successfully undergoing ordeals. At Carrawburgh, on Hadrian's wall, a mithraeum had a stone box in which the novices were entombed for some time in order to test their courage. Ritual eating and drinking were part of the ceremony and the participants reclined on stone benches along the sides of the nave of the temple, which was very similar in shape to a small church.

Christianity became the official religion of the Emperor in A.D. 313, and many mithraea were systematically destroyed by Christians who considered Mithraism a mockery of their own religion.

When the famous London mithraeum was excavated at Walbrook several beautifully made pieces of sculpture were found de-

picting Mithras and other gods. These had been deliberately buried. As excavation continued a beautiful silver percolator, embossed with animals, was discovered where it had been concealed in the wall of the temple. It seems obvious that these precious objects were hidden away when Christianity became the official religion, in the reign of Constantine the Great.

Finds, from the Roman period that have a Christian significance occur occasionally. These usually consist of Christian symbols, in particular the "chi-rho" monogram carved and scratched on stone. A remarkable find is the painted chi-rho monogram on the wall plaster of a room at the Roman villa at Lullingstone, Kent. This room may have been used as a chapel, as it had a frieze of praying figures painted on the walls.

Some small Christian churches may have been built in Roman towns such as Silchester and St. Albans. Buildings of the right shape have been found but there is no evidence to show that these were in fact used for specifically Christian purposes.

THE ROMAN-SAXON PERIOD

By the fifth century A.D. the Roman occupation of Britain was becoming very weak. Tribes of Ireland, Scotland, and Europe outside Roman jurisdiction, were quick to take advantage of this and exploratory raids became more and more frequent. To try and hold back these invaders the authorities in Britain brought Saxon mercenary soldiers from Germany. Their pottery of a hybrid Saxon-Roman type has been found on Roman military stations on the east coasts of Britain.

This use of Saxon mercenaries misfired, and the soldiers, brought here to repel the Picts and Scots, became colonisers themselves. They brought over their families and pushed inland along the river valleys, looking for places to settle. As well as the Saxons, Angles from South Denmark, and Jutes from Jutland came here, and they settled in the whole of Eastern and Southern Britain.

King Arthur was probably more than a legend. He may have been the last of the Roman British chiefs who, by skilful tactics and the use of cavalry, was able to harry the invaders for some time until his forces were swamped by the sheer numbers of the enemy. The legend that Arthur was buried at Glastonbury may have some truth in it as monks from the monastery there excavated the grave of a large man who had with him an inscription stating him to be Arthur. The style of the inscriptions seems to indicate that it was genuine.

Our studies of Roman Britain must finish with the death of

Arthur and the massacre of many Britons by the Saxons at Pevensey in A.D. 491.

The excavation of a Roman site is a job not to be taken lightly. A task that looks as if it may be a fortnight's dig has often turned out to be of several seasons duration, if not a lifetime's work.

In Roman archaeology, perhaps more than any other kind we find that in solving a problem the excavator reveals half a dozen new ones and so on. The director of the dig must be most competent so that he can deal with complex problems of stratigraphy as the site may well contain the remains of a series of buildings that were burnt down, rebuilt, and altered several times before they ceased to fulfil a useful purpose. He must have a good working knowledge of the period, and, perhaps above all he must be able to control tactfully the considerable number of diggers that the site will probably need.

BOOKS TO READ

Roman Britain (Richmond), Penguin.

The Archaeology of Roman Britain (Collingwood), Oxford.

The Roman Army (Webster), Grosvenor Museum, Chester.

Everyday life in Roman and Anglo-Saxon Times

(M. & C. H. B. Quennell), Batsford.

The Great Invasion (Cottrell), Evans.

Seeing Roman Britain (Cottrell), Evans.

Roman Roads in Britain, Vols I and II (Margary), Phoenix House.

Roman London (Home), Eyre and Spottiswoode.

Lullingstone Roman Villa (Meates), Heinemann.

Guide to the Antiquities of Roman Britain, British Museum.

Roman Britain, Ordnance Survey Map.

CHAPTER IX

AFTER THE ROMANS

THE periods between the time of the Romans and today are the province of the historian, who studies chronicles, diaries and records, while the archaeologist is more concerned with buildings and personal belongings that the people of the various periods have left behind.

The Anglo-Saxons, when they came to Britain, had a pagan religion. Christianity had been introduced in late Roman times, and in the fifth and sixth centuries the Celtic Church in Ireland and the Scottish Hebrides was founded. By the seventh century Northumberland was converted to Christianity and churches were built.

The Saxons increased in numbers after their initial settlement in Britain, and we find their pagan cemeteries all over the country. Very often they are found when excavating sites of earlier periods, or accidentally by builders. The women were buried wearing ornate brooches, work boxes, and chatelaines, which were like key rings upon which hung such things as keys, spoons, toothpicks, and a "strike-a-light." The men would have their spears, swords, and shields. Food and drink were sometimes provided; the drink in a small pot. A feature of the cremation burials is that often the grave goods had also been burnt. We can imagine the dead person, accompanied by his needs for the journey to the new life, being burnt on a great pyre. We have preserved to this day poems and stories of the buildings of funeral pyres by Saxons and Vikings.

In Kent the pagan Saxons buried very valuable jewellery with their dead. The brooch was a necessary Saxon dress accessory, and the brooches from the Kentish cemeteries are richly decorated with gold and garnets.

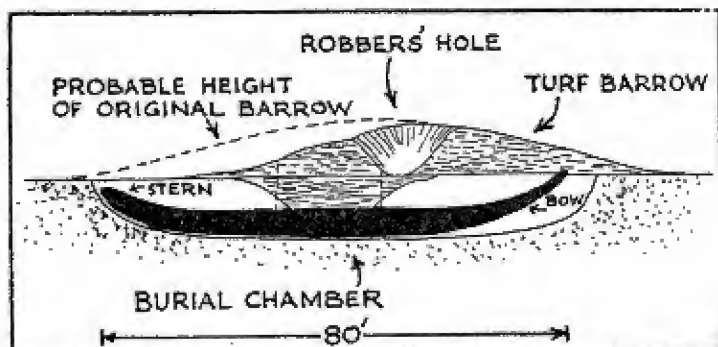
The most famous of the Kentish Saxon brooches came from Kingston Down near Canterbury and is now in the Liverpool City Museum.

There are several very rich Saxon burials in England. From one at Taplow, in Buckinghamshire has come beautiful glass ware, and two very large drinking horns decorated in gold. They accompanied

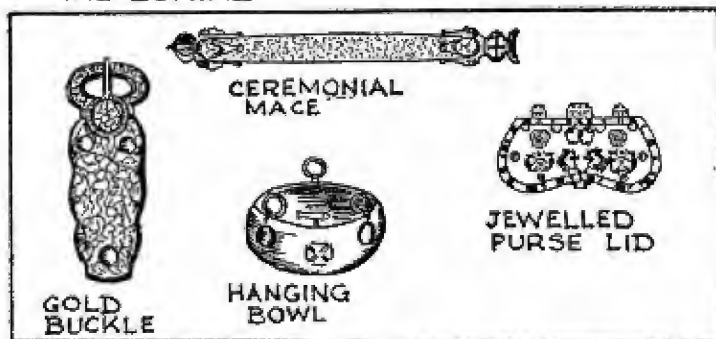
a warrior who had two shields, a spear, and a sword. His gold buckle and clasps were set with gold and lapis lazuli, a blue stone that comes from Afghanistan. Also in the grave were a bucket and bowl, a large tub, an iron knife, and a ring. The grave was covered by a large barrow.

Rich though the Taplow burial is, its magnificence does not approach that of the boat burial excavated in 1939 at Sutton Hoo near Woodbridge in Suffolk. In chapter I we looked at the helmet (Fig. 1). The shattered fragments of the helmet and a mass of most valuable treasure were found under the gabled cabin of a long rowing-boat that had been dragged up to its final resting-place on a sandy heath one hundred feet above the River Deben (Fig. 42).

The boat burial was covered by a barrow which was the largest of a group. One of the smaller barrows has been found to contain a



THE BURIAL



SOME OF THE FINDS

FIG. 42. The Sutton Hoo Ship Burial

boat also. As the excavators uncovered the remains in the largest barrow they discovered that the wood of the boat had decayed long ago but the iron nails that held the planks together were embedded in the sand. Where the planks had been, the sand had hardened, and so a clear impression of the boat had been preserved. This "fossil" cast was so precise that it was possible to work out exactly how the boat had been built.

The largest object found was a standard which was probably carried in front of the king. Also symbolic of royal status was a huge ceremonial whetstone with grim faces carved on the ends. As we would expect there were spears, a sword and a shield. As with the Taplow burial there were the remains of drinking horns and wooden buckets. The Sutton Hoo king was really well provided for his journey to the after life as he also had three cauldrons and a tripod stand from which to hang them.

There were also many silver dishes and bowls, and even two silver spoons which had on them the names "Saul" and "Paul." These words, and other symbols in the bowls and dishes, show that although this burial of the seventh century was pagan the influence of Christianity was already being felt in this area.

The richest finds from Sutton Hoo are a jewelled purse-lid, clasps, and a gold buckle. These valuable treasures are on show at the British Museum and are among the most important things to see there.

Also in the Museum is a reconstruction of a little harp that was found in a very decayed condition in the boat. Here indeed is a vivid link with life in the great Anglo-Saxon hall, where a bard would sing the stories and news of the day to the assembled throng.

There is one great mystery of the Sutton Hoo barrow, which made the whole excavation so tantalising. No remains of a body were found, and no king's name appeared on any of the finds. No one really knows for whom this barrow was erected. It has been suggested that the grave is a cenotaph for a great king lost in battle or at sea. If this is so he may well have been a pagan ruler, Aethelhere. Aethelhere's family had been converted to Christianity, we know that from the chronicles, and when the king died, they honoured him as a hero.

CHRISTIAN CHURCHES

There were two spheres of influence in the early church, the older Celtic Church in the North, and the Roman Church of the South founded by St. Augustine.

There is little trace nowadays of the churches built by the Celtic

missionaries in the North before the coming of St. Augustine. These must have been made of wood and thatch but their proportions appear to have been retained in the stone-built churches of the seventh century. Perhaps the best example is the church at Escombe in County Durham. The walls are very thick and the plan is very simple, just a nave and chancel. The nave is long and very high and has a small chancel arch. The chancel is square and narrower than the nave.

Churches of this type were built further south, and as a result of fusion of this and the Roman style many hybrid examples existed, especially in the Midlands.

There remain to this day some traces of the early churches founded by St. Augustine and his missionaries in Kent after their arrival in A.D. 597. A good example of one of these was the church of Saints Peter and Paul, Canterbury, where excavation has revealed the plan of the original building which was intended to hold the tombs of kings and archbishops. The layout is typical of the early Italian church which had developed directly from the Roman basilica. On either side of a short nave were side chapels. At the West end was an entrance hall called a "narthex," and the chancel appears to have been semicircular. The walls were thin in relation to the overall size of the church.

Church building on this Roman plan gradually spread northwards to the English Midlands, and at Brixworth in Northamptonshire we can still see an almost complete church of this style erected in the late seventh century.

Although not built by the Romans, Brixworth church gives a good impression of what a large Roman building must have been like. The similarity to Roman architecture is not only in the plan but also in the building materials used. The Saxons used Roman tiles which they had found nearby, but their workmanship was far cruder than that of the Romans. The study of these Saxon churches is somewhat specialised as there are so many variants in the styles.

THE VIKINGS

The great Viking period in Britain was in the ninth and early tenth centuries when successive bands of these restless craftsmen and traders settled on the Atlantic islands and the coastal regions from Shetland to Dublin, and made bases there for attacks on the rest of Britain and on the Continent.

The Vikings covered enormous distances in their pursuit of trade and loot. They ranged from the Middle East to Greenland, and most probably they reached America.

On Shetland the site of Jarlshof contains the remains of villages of six different periods. Two of these were Viking villages and they give us a very good impression of the type of farmhouses that they built in their settlements on these trade routes. The earliest one was built here at the beginning of the ninth century. It was seventy feet long and had a doorway on one long side set between two rooms, the smaller of which was a kitchen. The long walls were slightly bowed outwards, which is a feature of Viking houses and is thought maybe derived from the line of their boats. In the farm-house there was a long rectangular hearth down the centre of the living-room, and on each side was a stone dais on which was placed simple furniture. At a later period a byre was added to the living-room at the opposite end to the kitchen.

The Viking settlement at Jarlshof lasted for a considerable time and several other farm-houses were built. They all had the basic plan of the earliest house. On the floor there were some inscribed plaques. Two were portraits of men perhaps the founders of the estate; another showed a long boat of the type that was used by them to reach Shetland.

Where can you find the archaeological relics of the historic past? Most of the larger museums will have examples of the treasures from pagan Saxon cemeteries. By looking at the brooches, buckles, and clasps you will be able to appreciate the extraordinary level of craftsmanship achieved in this period.

Earlier in this chapter we have mentioned the Kingston Brooch and the Sutton Hoo treasure. Before leaving Saxon jewellery we should mention the famous Alfred Jewel, found in Somerset in 1693. Made in the ninth century, this two and a half inch long gem is made from gold and enamel. It was probably made as a mount for a bible pointer and depicts a holy man holding two sceptres. Round the edge, in gold filigree, is a sentence in dialect which means "Alfred ordered me to be made." It seems that the inscription refers to King Alfred. This jewel is now in the Ashmolean Museum at Oxford, and is well worth going to see.

In the many smaller museums in England you will be able to see less spectacular but equally interesting finds from the burial places of ordinary folk. These finds show us how less wealthy people dressed themselves—as flamboyantly as they could within their means. The brooches they wore were of many shapes the most common being like a cross, or a saucer.

Strings of beads were favoured by Saxon women. These were of many colours in glass and amber, and were hung across the chest and pinned to their clothes by a brooch at either end. As

well as the beads and the brooches, buckles, combs, glassware, rings, and corroded iron weapons usually make up the grave goods of these cemeteries. If you live in the South or East of Britain there is always a chance that by careful searching you will find one of these Saxon cemeteries. You will, however, need to be able to recognise in considerable detail the shapes and types of decoration used at that time to enable you to differentiate between Saxon relics and those of later periods.

Burials of the Christian period are less spectacular as grave goods were not included. From this time come the early churches as we have seen, and if you are particularly interested in them it would be best for you to go and look at the well known examples and become thoroughly familiar with the character of Saxon work. For anyone who has acquired the necessary knowledge, looking for undiscovered Saxon work in our churches can be most enjoyable and of real value to the archaeology of this period.

THE MEDIEVAL VILLAGE

Each man of a Medieval village had a toft, or yard, and a croft, or allotment behind his house. Between the end of the line of crofts and the large open fields was a small road or path which often exists to this day and is called Back Lane.

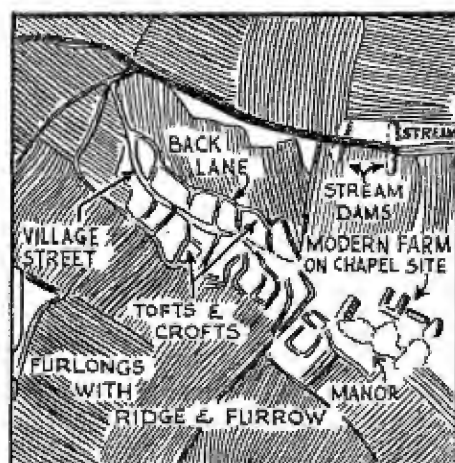


FIG. 43. A Deserted Village: Cestersover, Warwickshire, simplified

Attached to the village in Saxon and Medieval times were a number of large open fields. Each villager cultivated a number of strips spread over these fields. The right to cultivate them passed from father to son. Maps showing the arrangement of the strips with the owners' names on them, drawn up in the late sixteenth century, show an agricultural system dating from far earlier.

These strips, or furlongs, were ploughed so that the soil was heaped up in the centre leaving a drainage gully between adjacent strips. This method of ploughing is called "ridge and furrow." You can find examples all over the country where the land has been used in recent times for pasture. Where the fields are ploughed regularly the ridges and furrows have been flattened and usually have disappeared.

Ridge and furrow fields lie around the village to which they belong, but in some places no village remains although the fields are there (Fig. 43).

Often the church is the only building to survive, isolated among the fields perhaps a mile from the nearest existing settlement. The study of these deserted villages has only begun in earnest since the last war with the increase in the use of aerial photography.

EARLY HOUSES

Houses, like villages, evolved gradually from the simple dwellings of Iron age and Saxon times. There were two basic types of dwelling in the Saxon period: the long-house in which lived the peasant farmer, and the hall belonging to the chief family in the village.

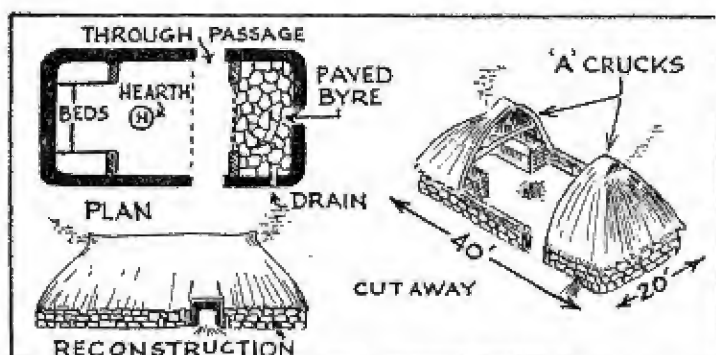
The long-house consisted of a long building divided in the middle by a transverse passage (Fig. 44, top). On one side lived the family, whilst across the passage was the byre. The fireplace was in the centre and heated both the house and the animal quarters.

Examples of this house plan can be seen today in the "Black houses" of the Hebrides and the long-houses of Wales.

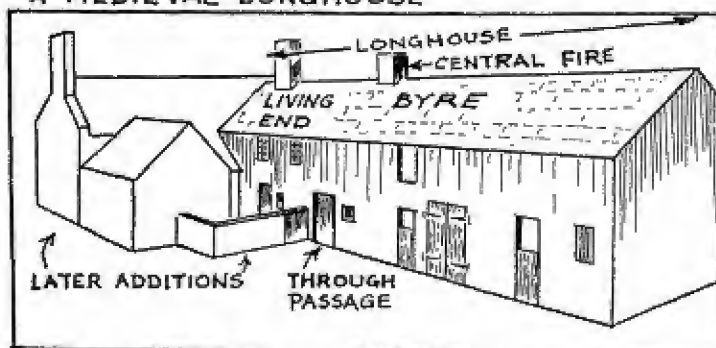
In Wales today many of these farm-houses have a later addition built at right angles to the living end of the long-house (Fig. 44, bottom). This end serves as parlour and bedrooms whilst the old living space becomes a large kitchen and dairy.

It used to be thought that the long-house was restricted in distribution to the Celtic north and west. Now that the Medieval lost villages are being excavated other ideas prevail and we now know that the long-house is quite typical of the English village of those days.

From origins in North Germany, come the Anglo-Saxon



A MEDIEVAL LONGHOUSE



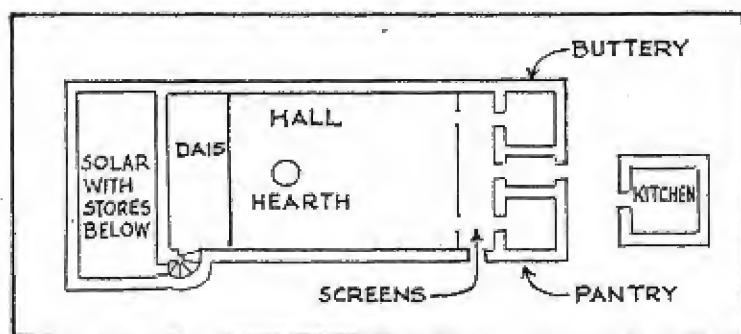
A WELSH LONGHOUSE - TREMEIRCHION

FIG. 44

halls. These were larger than the long-houses. Often the cattle were housed in stalls along the sides of the hall and in the centre was the fire. The smoke passed out through a central hole in the roof or through gaps left under the gables.

From this type of house developed the Medieval hall-house. Here, the large hall in which the whole household lived, was divided from the kitchen and pantry by a passage leading from the front door (Fig. 45, top). Wooden screens divided the passage from the hall and gave their name to this passage which is sometimes known as the "screens." At the opposite end of the hall to the screens was the dais on which was the master's table and behind the dais lay the master's own room or "solar."

Two good examples of this type of hall are Stokesay Castle in



THE PLAN OF A MEDIEVAL HALL

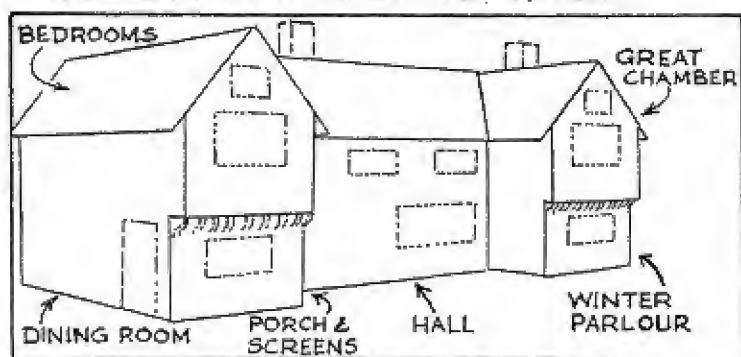
A 15TH CENTURY 'HALL HOUSE'

FIG. 45

Shropshire, and the Old Palace at Hatfield. The halls of the colleges at Oxford and Cambridge were built on this plan as well as the country houses constructed towards the end of the Middle Ages.

By the fifteenth century the proportions of the house had changed. The hall was still central and approached by the screens passage from the front door, but it was much smaller than in houses built in previous centuries. The solar and buttery areas were expanded. The solar now contained more spacious living-rooms for the family, and the kitchen area was converted into a private dining-room and further bedrooms. The kitchens were moved to the yard at the rear of the house. The house now had a central hall area with a gabled wing at right angles at each end (Fig. 45, bottom).

If you look around in your area, especially if you live in Southern

England, you will find manor houses and large farms of this type.

Many of the "stately homes" are built on this plan. The magnificent hall had a raised dais at one end and at the other were elaborately carved wooden screens with a minstrels gallery over them. It was the Renaissance when men desired to emulate classical symmetry and proportions which ended this style of building.

BOOKS TO READ

The Anglo-Saxons (Wilson), Thames and Hudson.

Everyday life in Roman and Anglo-Saxon Times

(M. & C. H. B. Quennell), Batsford.

Introduction to Anglo-Saxon England (Blair), Cambridge.

The Vikings (Arbman), Thames and Hudson.

Herdsmen and Hermits (Lethbridge), Bowes & Bowes, Cambridge.

Introduction to Anglo-Saxon Art and Architecture (Fisher), Faber.

The Lost Villages of England (Beresford), Lutterworth.

Medieval England (Beresford & St. Joseph), Cambridge.

The English Farmhouse and Cottage (Barley), Routledge & Kegan Paul.

CHAPTER X

SCIENCE AND ARCHAEOLOGY

THE aim of this chapter is to give a very brief outline of some of the problems which confront the prospective director of a modern dig. Many of these are not obvious to the amateur, and lack of knowledge of the assistance available to archaeologists these days can lead to a great waste of effort. A badly managed dig can produce only a fraction of the evidence that would be revealed if it were properly organised by an experienced and well informed director. Much more important than the time and expense wasted is the destruction of an irreplaceable national monument without its yielding its most interesting secrets.

Once an archaeological site has been recognised as such an enormous amount of work must go on before any earth is moved. A careful scrutiny has to be made of all the available aerial photographs; meticulous observations have to be made in the field; and the site is usually surveyed. Ordinary surveying methods are used but an extraordinary amount of attention is paid to apparently insignificant details. After a large scale contour plan has been drawn, many features which passed unnoticed will have become obvious. By this time the trained archaeologist will probably have a good idea of the sort of site it is. He will also know roughly to which period of time it belongs.

Supposing that it is decided to excavate the site because it is thought that it may add to our knowledge of archaeology, how does the director know where in particular to lay his trenches? As a start he tries to find what structures lie below the ground without actually digging to find out. The methods of doing this vary from the very simple to the most complex. One of the simplest methods is to thump the ground with a heavy weight on the end of a stick and to listen to the sound it makes. A dull thud may show that the ground beneath has never been disturbed, whereas a more hollow sound may indicate underlying structures. This is called *bosing* and was used with great effect to locate the ditches of the Neolithic camp at Whitehawk near Brighton.

Another simple method is to use an extra large corkscrew or *auger* to withdraw a sample of earth from the site. This is clearly not advisable on the site of a Roman villa but can be useful where there is little danger of spoiling the future excavation.

Two electrical methods have recently come into prominence as they can give an extensive picture of a site even before excavation.

The *resistivity-meter* measures the electrical resistance of the ground which varies with depth of soil—the deeper the soil, the less the resistance. Thus the resistance of the ground over a buried wall will be higher than that over a pit or ditch. Metal probes are connected to a box which has a power supply and a measuring circuit. By working across the site on a grid pattern the area can be covered quite quickly.

In recent years the *proton-magnetometer* has been used to supplement or even supersede the resistivity meter. The instrument, which was found to be useful for prospecting for minerals from the air, has now become a regular feature of archaeological surveying. In archaeology its function is to measure the magnetic properties of iron oxides in the soil. The presence of humic material from rotted vegetation, that has been washed down from the surface, changes the unmagnetic oxide, haematite, derived from the underlying rock, into maghemite, a magnetic form. This means that where there is a greater depth of soil in a ditch or pit, the ground in the area will have a greater magnetic susceptibility than that surrounding it, where the soil layer is thinner. The proton magnetometer detects this.

To detect this variation, its effect on the hydrogen protons in a bottle of water suspended above the ground is measured. Round the bottle is a coil of wire, the axis of which is maintained east-west. An electric current is passed through the coil, and this polarises the axis of each proton in an east-west direction. The current is then switched off and the earth's magnetic field pulls the protons round through ninety degrees. As the protons are spinning like tops they do not re-orientate themselves immediately but rotate for a short time about the new axis. The frequency of this rotation called "precession" is proportional to the intensity of the surrounding magnetic fields of the earth and the underlying ground. Owing to the initial polarising field aligning them, the protons all precess in phase, and a minute voltage is induced back into the coil of wire round the bottle. This voltage is measured. The greater the voltage, the deeper the soil.

Although the theory and apparatus concerned are rather complicated the operation itself is quite simple, and, as with resistivity surveying, a large area can be covered in a short space of time.

Having determined where to lay the trenches that will tell him most about the site, the director of the dig proceeds to measure out the cuttings, with reference to the original survey, and to dig a quick trial trench in an unimportant spot, so that he can give some idea of what to expect to the rest of the party.

At this stage he will already have arranged for numerous specialists to be available to help him with the interpretation of his site. These include geologists, botanists, zoologists, chemists, and physicists. Laboratories are maintained by the large museums and by the universities in order to deal with material from excavations, and these will have been invited to assist in the specialist work that goes on long after the digging has finished.

It is the director's responsibility to collect such samples as are required by these experts and to deliver them in a state fit for examination. If careful sampling is used a great deal will be found out about the site without any further digging although this will of course go on to see if any artifacts have survived.

Samples of each type of soil encountered are taken and kept for examination by experts. These samples may indicate the climate that was being experienced at the time of their deposition, and also the vegetation that was growing. Sometimes if there have been no bones preserved in the soil it is useful to have the phosphorous content determined as this is an indicator of the presence of decomposed bone.

Any strange stones should be collected as they may have been carried from far away, either by man or by natural agencies. From these we can often trace journeys made thousands of years ago in search of vital or precious materials such as amber, stone for axes and grinding corn.

The shells of snails and shellfish, both marine and freshwater, are very interesting as they show by their species the exact environment of their day. If found in large numbers they may be the remains of tasty meals of long ago.

All bones should be collected as they can be identified by zoologists, and will show the animals present on the site and also the type of humans, their habits and diseases. By the condition of the bones it is possible to tell whether the human beings or animals died naturally, were killed, or were eaten.

Until recently it has been difficult to prove the authenticity of bones from Palaeolithic deposits. The famous Piltdown skull was argued over for many years; but it was not until 1953, when the chemical composition of the bone and the supposed associated implements were analysed, that the whole assemblage was proved to be bogus. This mistake will not happen again as it is now routine

practice to submit any newly-discovered fossil bones of humans to these tests.

The artifacts found on a site can often reveal much about their owners. Analysis of their chemical composition will provide clues to the origin of the raw materials, and to the techniques used in their manufacture. By detecting ores from definite sources it has been possible to show that in the Bronze Age some metal tools have come to Britain from as far away as Eastern Europe.

The absolute dating in years B.C. of illiterate prehistoric groups in Europe, from the Neolithic Age to the Iron Age, has been carried out in the past mainly by the use of relative methods. For example, beads made in the Eastern Mediterranean area can be given a date from the Egyptian calendar and have been found with burials of pastoral folk in Britain. These glass-like faience beads were bartered across Europe and are used by archaeologists to date our British barrows.

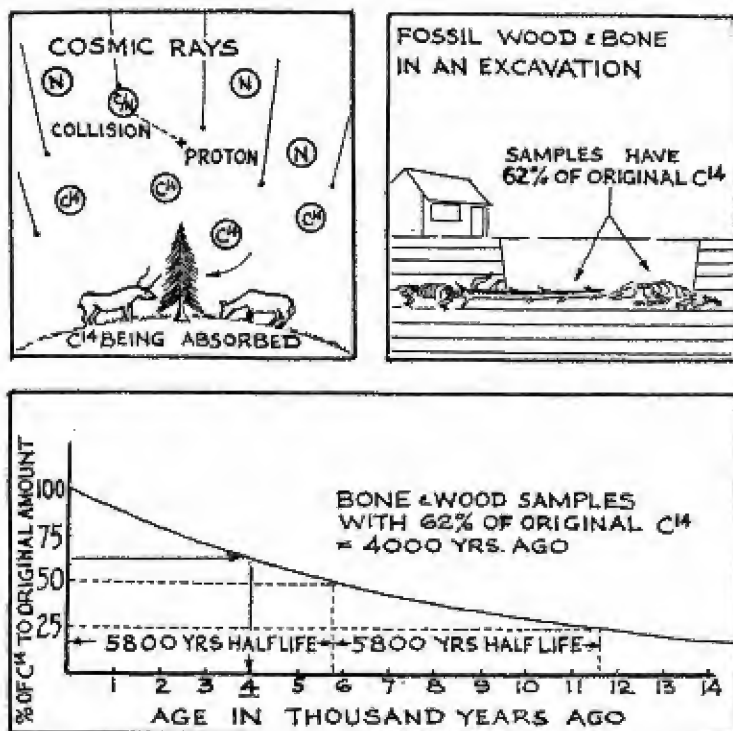
This type of dating by association has been developed to a high degree and is usually sound, although several mistakes have been revealed by recent dating methods which depend on the gradual breakdown of the radioactive isotope carbon¹⁴ found in all living things.

Atmospheric nitrogen, of atomic weight 14, is bombarded with neutrons produced by cosmic radiation in the upper atmosphere. One neutron enters the atom and displaces one proton. The new element formed is carbon¹⁴. Ordinary carbon has an atomic weight of 12. The heavy isotope carbon¹⁴ is radioactive and by the loss of an electron, reverts to the stable non-radioactive form nitrogen¹⁴. Carbon¹⁴ is being formed all the time in the upper atmosphere and when it filters down to the earth's surface it becomes incorporated in living plants along with its stable form carbon¹².

The proportion of carbon¹⁴ to carbon¹² in the air and therefore in living plants is constant and is about one part in one million million, but on the death of the plant the carbon¹⁴ present slowly changes to nitrogen¹⁴, and so the proportion of carbon¹⁴ to carbon¹² becomes less. Not only do plants show mixture of the two forms of carbon but also all animal life which ultimately derives its food from plants.

The proportion of carbon¹⁴ to carbon¹² can be measured by use of a Geiger counter which measures the rate of emission of electrons as carbon¹⁴ changes to nitrogen. The proportion of carbon¹⁴ in a sample of dead matter will therefore be a measure of the time that has elapsed since its death (Fig. 46).

The rate of decay of carbon¹⁴ has been worked out, and after

FIG. 46. Dating by Means of Radioactive Carbon¹⁴

5,800 years only one half of the original weight of carbon¹⁴ remains. The rate of decay gradually slows up so that during the next 5,800 years only half of the remaining carbon¹⁴ reverts to nitrogen. The radioactivity thus becomes rapidly weaker but never actually ceases altogether. 5,800 years is called the *half-life* of carbon¹⁴. Other isotopes of other elements decay at different rates, and so have other half-lives, some as small as one millionth of a second and some thousands of millions of years.

The carbon¹⁴ method of dating is particularly useful for measuring dates up to 20,000 years ago as during this period decay is reasonably detectable. Beyond this, the residual activity is so weak that dates obtained are very vague indeed.

Almost any dead material is suitable for dating by this method

provided the actual organic matter remains. Charcoal is the most usual material tested but bones, leather, etc., have been used occasionally.

If samples are to be collected from an excavation for carbon¹⁴ dating they must be handled most carefully to prevent contamination with modern carbon.

Apart from dating individual sites, carbon¹⁴ has been useful in giving an absolute date to the post glacial forest sequence (Fig. 13). The stages by which vegetation developed from Ice Age conditions to warm oak forest had been worked out long before carbon¹⁴ was available. The stages in tundra and forest development reveal definite climatic periods. By calculating the percentages of pollen of different plants present, a deposit can be allotted to the correct place in the sequence. As numerous samples from the different stages or zones have now been dated by carbon¹⁴ it is possible to give an approximate absolute date merely by examination of the pollen.

Some idea of the dates of the pollen zones had already been obtained by direct counting of the yearly layers of sediment, or *varves*, on lake beds in Sweden. The dates given by the two methods correlate very satisfactorily.

Just as carbon¹⁴ is used to date back to the end of the last glaciation, 20,000 years ago, another method has been devised to date much older deposits by using a radioactive isotope of potassium: potassium 40, which decays into calcium and then into argon and has a half life of 1.3×10^9 (1,300,000,000) years. The recent finds of fossil man and his tools from Olduvai Gorge in Tanganyika have been dated by use of this method to about 1,500,000 years ago.

The accurate detection of minute amounts of magnetism has helped in the dating of pottery kilns and hearths in recent years. When raised to a high temperature the molecules of iron oxide in the clay realign themselves from a haphazard pattern to be parallel to the axis of the Earth's magnetic field. Magnetic north in Britain is today about nine and a quarter degrees west of due north. It has not always been so, as this magnetic declination is continually changing. The gradual drifting of the magnetic poles is called secular variation, and it has been recorded only for the last few hundred years.

As the magnetism of the clay in an ancient pottery kiln and hearth "froze" at the last firing to the alignment of the secular variation of the time, it has been possible to plot this variation from datable kilns and hearths before the time of accurate recording.

As a result of this work graphs have been drawn that plot

historic and prehistoric time against secular variation. The magnetic poles swing east and west like a pendulum. They swing from one side of the poles to the other taking 400 to 500 years over one cycle. If a kiln or hearth is to be dated, several fired pieces of clay are taken from it and their secular variations accurately measured. If the mean of these results is referred to the graphs, the date of the kiln can be found.

This swinging of the magnetic poles means that, for a given variation, several dates are possible, but the form of the kiln and its associated small finds will show to which cycle it belongs.

These modern methods of dating archaeological material are becoming more and more important, and no doubt there will be many more available shortly. This chapter however is intended to show how modern archaeologists are tending to rely more and more on all branches of science.

BOOKS TO READ

- Physics and Archaeology* (Aitken), International Publishers.
Bones for the Archaeologist (Cornwall), Phoenix House.
Soils for the Archaeologist (Cornwall), Phoenix House.
Dating the Past (Zeuner), Methuen.

CHAPTER XI

HINTS FOR FURTHER STUDY

If you become interested in archaeology, as well as the many excellent books published on the subject, you may find interesting the journals published by the various archaeological societies up and down the country. These contain reports on actual digs and also articles of general information. You may find that there is a local society in your town, if not there will most probably be a county society in whose journal you will be able to read about events in your locality. You may even consider joining a society as they frequently hold meetings at which members and guest lecturers read papers and which provide a place to meet others interested in archaeology. Ask your librarian for the information you require.

The best way to find out what digs are going on is to subscribe to the *Calendar of Excavations* published by the Council for British Archaeology which is circulated monthly during the summer months and is obtainable for an annual subscription of five shillings. The Council exists to integrate archaeological activity in Britain and to provide advice and information on archaeological matters. The Council is always willing to answer enquiries on such topics as careers in archaeology, training in fieldwork, advice on chance finds, and the legal aspects of archaeology. The address is: Council for British Archaeology, 10 Bolton Gardens, London, S.W.5.

Also of interest to the beginner and more advanced students is *The Archaeological Newsletter*. This little journal is published about once a month and contains accounts of current excavations plus articles on specific subjects and details of future excavations, especially training digs for beginners. This magazine costs two shillings a copy plus postage, or you may choose to make an annual subscription. It is obtainable from *The Archaeological Newsletter*, 60 Frederick Street, Grays Inn Road, London W.C.1.

For the serious student of archaeology there are several important journals to read. *The Proceedings of the Prehistoric Society*, *The Antiquaries' Journal*, *Archaeologia*, and *The Journal of Roman*

Studies are all published periodically, and the best way to find out the sort of articles in them is to have a look at a copy at your library. They are all reference works rather than ordinary reading matter, but you may wish to consult them for details on a particular site or topic.

Antiquity is a quarterly review of archaeology and is for the more serious reader. It contains résumés of large excavations in different places in the world plus articles on current controversial subjects, and a section on "Notes and News" and many book reviews. *Antiquity* can be obtained from: W. Heffer and Sons Ltd., 104 Hills Road, Cambridge. The price is ten shillings and sixpence a copy, or thirty shillings a year.

Probably the best way to gain a theoretical knowledge of archaeology is to attend an organised course in the subject. These vary from the degree courses in the universities, part-time diploma courses, residential holiday-courses, and evening classes. Apart from the full-time university courses, details of which can be obtained from the Registrars, most of these courses are run by the Extra-Mural Departments of the universities, local education authorities, and organisations such as the Workers' Educational Association. Write to these bodies in your area, or consult your library for information. You will probably find that there is a class suitable for you. If there is not, demonstration of sufficient support will encourage your education authority to provide one.

Many classes organise their own excavation during the summer under the guidance of their tutors, and these are a valuable way of learning what digging is all about.

APPENDIX

FLINTS

It adds much to the interest of archaeology to understand the techniques used by primitive man to make his tools and weapons. By understanding exactly how stone tools are made it is possible to reconstruct quite accurately a few seconds in the life of men of a quarter of a million years ago.

We can see how he must have sized up the problem of making a hand-axe from a lump of flint, and how he went about it. We frequently find tools which were three-quarters made, and which snapped off in the wrong place at the last stage. We can imagine the primitive language to which the disgusted workman gave vent as he threw it down and started all over again.

The best way of understanding the tricks of the flint knappers, trade is to get hold of some flint and try yourself. But beware! Newly struck flint is remarkably sharp. It had to be to skin a mammoth! Be warned. Wear leather gloves and keep it well away from your eyes.

It was because of this sharpness and also the ease of working that led prehistoric man to use flint wherever possible. However, other stones, such as chert, quartzite, volcanic tuff, or even crystalline quartz, have been used when flint was not available. It is only possible to work flint if it has no flaws in it. For this reason early man obtained his raw material either by mining flint, which had not been fractured by frost, or by selecting large tough pebbles from rivers. These pebbles had survived the heavy battering caused by river rolling.

In order to remove chips or "flakes" from a block of flint, a hammer-stone is needed which should be about fist sized, and rather softer and more resilient than flint. It so happens that in a river gravel there is usually a whole range of pebbles of differing sizes and types of stone. In our British rivers the so called "Bunter" quartzite pebbles make admirable hammer-stones.

If a block of flint is struck face on by a hammer-stone either nothing will happen or else the block will shatter into many pieces.

To remove flakes in a controlled manner the block has to be struck with a glancing blow near one of its edges, whereupon a flake will fall away below the point of impact (Fig. 47). This flake so produced will have a characteristic "S" shaped profile on its newly fractured face, known as the "main-flake-surface." Where the hammer-stone actually struck the flint there will be a bulge or the "bulb of percussion," and at the top of the flake will be a small remnant of the upper surface of the parent block. This is called the "striking platform." Radiating from the point of impact on the main-flake-surface will be fine fissures whilst a series of concentric ripples give the flake a shell like appearance. For this reason flint and similar materials, such as glass, and obsidian, are said to fracture "conchoidally."

The size and direction of flaking by a series of conchoidal fractures can be controlled so that the parent block may be fashioned

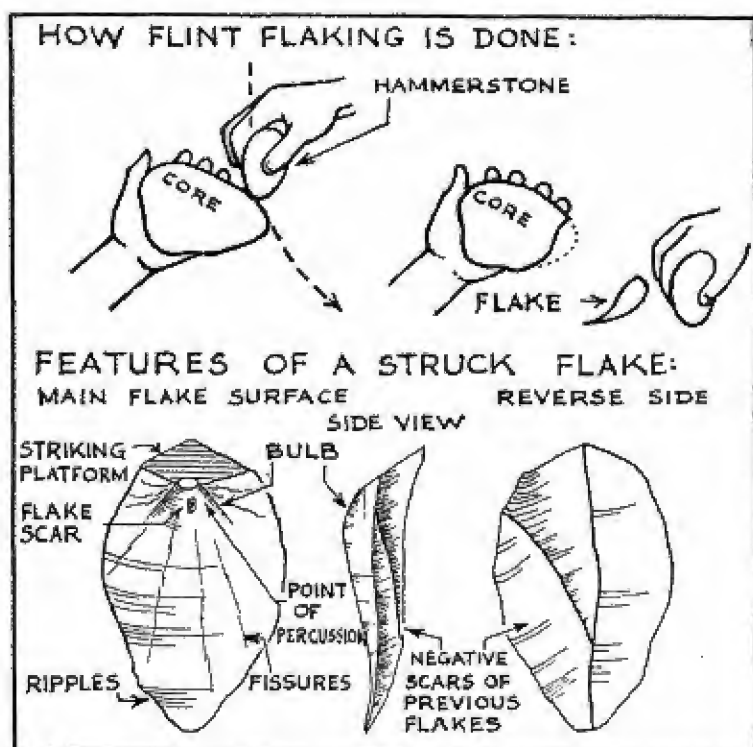


FIG. 47. The Technique of Flint Flaking

into tools of many different shapes. These tools will show their human origin by the many scars over their surfaces, which will be the exact negatives of the flakes that were removed (Fig. 47).

Most Stone Age people used some of the flakes as tools as well as the fashioned cores. Usually we find that a particular group made more use of one or the other.

Flint-knapping is not a lengthy process, and even the very best of tools found of the Stone Ages would have only taken a few minutes to produce.

Tools were knocked up on the spot as required, used and discarded when blunted. Consequently on Stone Age sites quite a heavy scatter of flints may mean only a couple of nights camping by a family group or hunting party.

INDEX

- ABBEVILLIAN, 40
 Abinger Common, 51
 Acheulian, 40
 Agriculture, 18, 56
 Alfred jewel, 109
 All Cannings Cross, 79
 Amber, 66
 Anglo-Saxons, 105
 Avebury, 58, 68, 69, 70
 Axe factories, 60
 Aylesford, 89

 BARROWS, long, 59, 62-3, 75
 Barrows, round, 64
 Battersea, 88
 Beaker folk, 64-5
 Belgae, 78
 Belgic art, 87
 Belgic earthworks, 89
 Birdlip, 87
 Bleasdale, 72-3
 Brecklands, 61
 Brixworth, 108
 Brochs, 86
 Bronze Age, 19, 66-76
 Broxbourne, 50, 51
 Bush barrow, 66-7

 CAMULODUNUM, 89
 Caves, 43
 Celtic fields, 19, 20
 Celts, 77, 78
 Chariots, 84
 Chellean, 40
 Christianity, 107
 Chysauster, 85, 86
 Clactonian, 38, 40
 Clegyr Boia, 59
 Colchester, 92, 98
 Copper, 65
 Cotswolds, 82
 Courtyard houses, 85
 Crô Magnon, 44

 Crop marks, 21

 DANUBIAN, 57, 58
 Dartmoor, 72
 Dating, absolute, 34, 118-121
 Dating, relative, 118
 Desborough, 87
 Ditchley, 100
 Drachenloch, 41
 Druids, 65, 66, 84

 ERTEROLLE, 49
 Escombe, 108
 Excavation, 12, 27-31, 54, 75-6,
 104

 FLINT knapping, 124-6
 Folkton, 71
 Food Vessels, 71
 Fosse Way, 93

 GEOLOGY, 14-17
 Glastonbury, 85
 Gold, 65, 66
 Grimes Graves, 61
 Gwithian, 73

 HADRIAN'S Wall, 97
 Haldon, 59
 Hall house, 111-14
 Hallstatt, 77, 78
 Hand axes, 36-40
 Henge, 65, 68, 73
 Hill figures, 88
 Hill forts, 81-2
 Hoards, 73-4
 Hornsea, 50
 Hove, 66

 ICE AGE, 33
 Iceni, 98
 Iron, 77
 Iron Age, 18, 19, 77-90

Itford Hill, 73

JARLSHOF, 86, 109

Journals, 122-3

KINGSTON Down, 105

Kitchen middens, 49

LANHILL, 63

La Tène, 78, 80

Levallois, 40

Lexden, 89

Little Woodbury, 78-9

Llyn Cerrig Bach, 83-4

Long house, 111

Loose Howe, 71

Lough Gur, 59

Lullingstone, 103

Lynchets, 19-20

MAGLEMOSIAN, 49, 50

Maiden Castle, 22-3

Maps, 18, 41, 53, 99

Meare, 85

Medieval village, 110

Megalithic tombs, 62, 75

Mesolithic, 46-55

Microoliths, 48, 51

Milankovitch, 33

Mithraism, 102

Mold, 66

Mousa, 86

Mousterian, 40

Museums, 12

Myceneans, 66, 71

NEANDERTHAL man, 40, 41

Neolithic, 56-64

Neolithic barrows, 59

Neolithic causewayed camps, 59-60

Neolithic sites, 74

Notgrove, 63

Nutbane, 59

OLDUVAI Gorge, 35, 36

Overton Hill, 70

PALAEOLITHIC, 33-45

Pebble tools, 36, 37

Pekin man, 37

Pennines, 51

Plotting finds, 54

Pollen analysis, 46

Presely Mountains, 68

Proconsul africanus, 35

RECORDING, 29, 42

Richborough, 92

Ridge and furrow, 111

Rillaton, 66

Romans, 19, 91-104

SAXONS, 18, 103

Salisbury Plain, 59, 66, 73

Severn: Cotswold tombs, 62-3

Silchester, 99, 103

Skara Brae, 63-4, 86

Snettisham, 88

Societies, 123

St. Albans, 98, 99, 103

Star Carr, 23, 49, 50

Stokesay Castle, 112

Stonehenge, 68-71, 84

Stratigraphy, 31

Sutton Hoo, 11, 106-7

TAPLOW, 105-6

Thatcham, 50, 51

Tools, 25-7

Tool making, 34-9

Typology, 11

UFFINGTON, 88, 89

Urn folk, 72

VEGETATION, 17-18, 21

Vikings, 108-9

WESSEX Culture, 66-8

Wheel house, 86

Whitehawk, 60, 115

Witham, 83

Windmill Hill, 58, 61

Zinjanthropus Boisei, 36







"A book that is shut is but a block"

CENTRAL ARCHAEOLOGICAL LIBRARY

GOVT. OF INDIA
Department of Archaeology
NEW DELHI.

Please help us to keep the book
clean and moving.

S. B. 148. N. DELHI.